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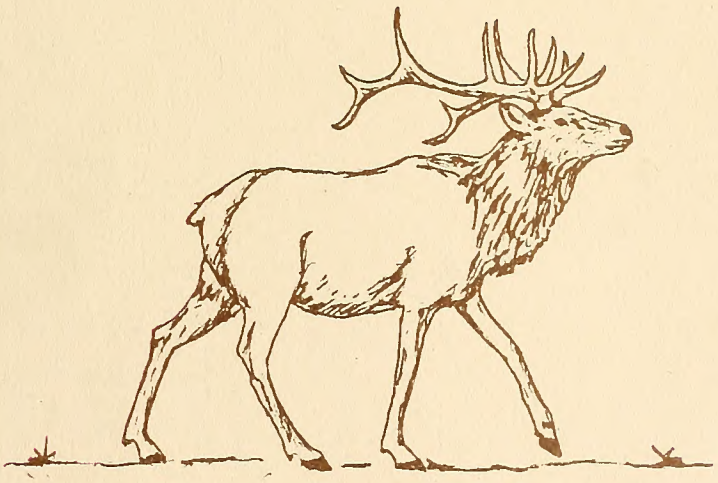
North Carolina Department of Transportation
Statewide Planning Branch
Small Urban Planning Unit

THOROUGHFARE PLAN
FOR
ELKIN
JONESVILLE ARLINGTON



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ELKIN-JONESVILLE-ARLINGTON
THOROUGHFARE PLAN

March, 1992

Prepared by the:
Small Urban Planning Unit
Statewide Planning Branch
North Carolina Department of Transportation

In Cooperation with:
The Town of Elkin
The Town of Jonesville
The Town of Arlington
The Federal Highway Administration
The U.S. Department of Transportation

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ACKNOWLEDGMENTS

The coordinated efforts of many individuals and government agencies made the 1991 Elkin-Jonesville-Arlington Thoroughfare Plan possible. When this thoroughfare planning process was started in 1989, J. T. Newnam, P.E. was the Thoroughfare Planning Engineer and J. T. Gerber was the Project Engineer. They initiated the thoroughfare planning process and coordinated the socio-economic data collection. The Town of Elkin contracted with the Department of Geography and Planning at Appalachian State University to collect the data.

In 1990, the North Carolina General Assembly established funding for a Small Urban Unit to provide transportation planning services for urban areas with a population under 50,000. At that time D. G. Modlin, Ph.D., P.E. became the Thoroughfare Planning Engineer and F. L. Robson became the Project Engineer. F. L. Robson developed a computerized traffic model, completed the thoroughfare planning process and wrote this report. The Thoroughfare Planning Engineer was responsible for providing necessary practical experience to ensure the plan was based on sound engineering principles. The Statewide Planning Branch Manager was responsible for making sure the thoroughfare plan conformed with Department of Transportation policy.

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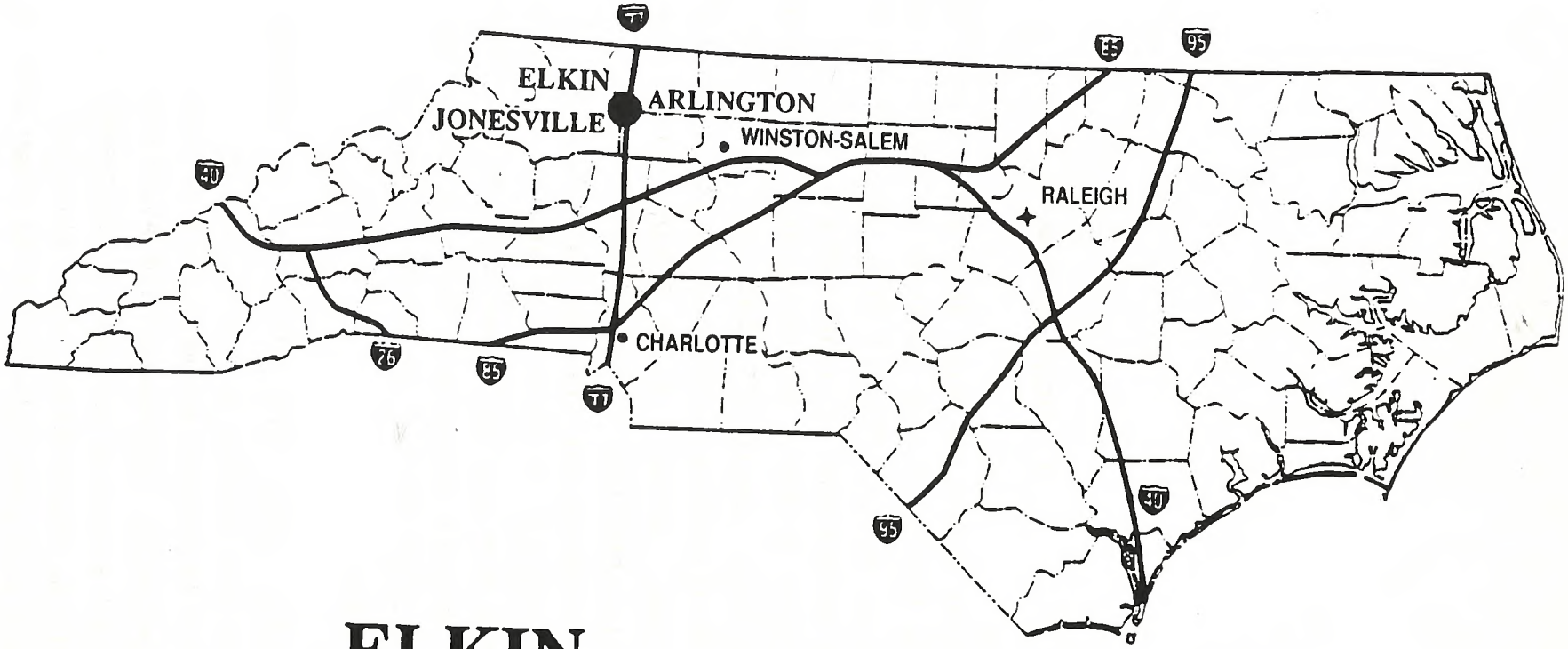
I. INTRODUCTION

Situated in Surry, Wilkes, and Yadkin Counties, Elkin, Jonesville and Arlington are located in North Carolina's western Piedmont Region (Figure 1). The Town of Elkin requested the Department of Transportation for assistance in updating the June 9, 1983, Elkin-Jonesville-Arlington Thoroughfare Plan. Local officials and local citizens from all three communities participated in the thoroughfare planning process. After a joint Elkin, Jonesville, and Arlington public hearing on May 14, 1991, the Elkin Board of Commissioners adopted the Thoroughfare Plan map dated May 1991. The Jonesville Town Council and the Arlington Town Council adopted the May 1991 Thoroughfare Plan map at their June 3, 1991 council meetings. Subsequently, the North Carolina Department of Transportation adopted the plan on October 11, 1991.

Thoroughfare plans are long range transportation plans which document how twenty years of future development will affect traffic on the existing street system. As the statewide population increases, and available land is depleted around existing cities, development will spread to areas like Elkin, Jonesville, and Arlington which have available land and good Interstate Highway access. With

GEOGRAPHIC LOCATION



ELKIN
JONESVILLE ARLINGTON
NORTH CAROLINA

FIGURE 1

Elkin, Jonesville, and Arlington only minutes from Interstate-77, thoroughfare planning is a necessary tool for guiding and controlling development to prevent traffic congestion problems. In addition, properly maintained thoroughfare plans, along with active local planning, can help protect the small town character and quality of life Elkin, Jonesville, and Arlington now enjoy.

II. THOROUGHFARE PLANNING PRINCIPLES

Through time, villages grow into towns, towns grow into small cities, and small cities grow into large cities. All communities are dynamic places, constantly changing to keep pace with the increasing demands of today's citizens. Older buildings are replaced with newer more efficient structures. Agricultural land is converted to residential or commercial land. Low density zones are raised to high density zones to allow more people to use smaller parcels of land.

Only the roads remain much the same today as they were when they were originally built. True, today's engineered asphalt and concrete roads are far more efficient than the horse and buggy trails of yesterday. But, often the old horse and buggy trail alignment is the only alignment available for new highways. Once communities establish development patterns based on the existing roads, improving the alignment of the roads is difficult and sometimes impossible. Even after General Sherman burned Atlanta to the ground during the American Civil War, the city was still rebuilt using the original road corridors. Since the street system is permanent and expensive to build, policy makers established thoroughfare planning principles to guide transportation planning.

OBJECTIVES

The primary objective of thoroughfare planning is to provide a transportation system which can progressively develop to meet future travel demands. By developing the urban street system to keep pace with increasing traffic

demands, street capacity can be maximized. Proper planning saves money by eliminating unnecessary improvements and minimizing the amount of land needed for streets.

Other thoroughfare planning objectives include:

1. reducing transportation related environmental impacts, such as air, water, land, and noise pollution,
2. reducing travel and transportation costs,
3. reducing the cost of street improvements to the public through the coordination of subdivision and commercial developments with street developments,
4. enabling local citizens to plan their actions with full knowledge of public intent,
5. minimizing disruption and displacement of people and businesses through published long range street improvement plans, and
6. increasing travel safety.

Thoroughfare planning objectives are achieved by improving the "operational efficiency" and the "system efficiency" of the street system. Improving the operational efficiency means increasing street capacity. Improving system efficiency means coordinating all the streets to support each other.

OPERATIONAL EFFICIENCY

A street's operational efficiency is the ability of the street to carry vehicles and people. A street's traffic capacity is the maximum number of vehicles which can pass a given location during a given time under the existing traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather. Three ways to improve street capacity are: physical roadway improvements, traffic flow management, and travel demand management.

Although physical road improvements are typically the first method people think of to increase capacity, physical improvements are very expensive and often politically controversial. Physical road improvements include: adding lanes, modifying intersections, improving vertical alignment, improving horizontal alignment, and eliminating roadside obstacles. By reducing the impedances to the main traffic flow caused by slow moving or turning vehicles, these improvements can significantly increase street capacity.

Traffic flow management improvements are another effective method for increasing street capacity. Although the political controversy can still be significant, traffic flow management generally costs less than physical road improvements. Traffic flow management improvements include:

1. Controlling land access -- A roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with the same number of lanes.
2. Removing parking -- By removing parking, additional street width is available for traffic. The additional width can make another traffic lane or simply reduce traffic friction caused by parking vehicles.
3. One-way operation -- One-way streets can handle 20-50 percent more vehicles than two-way streets with the same number of lanes. One-way streets also improve traffic flow by decreasing potential traffic accidents and increasing intersection capacity.
4. Minimizing traffic signals -- Each traffic signal reduces the amount of time available for traffic to travel straight through an intersection.
5. Spacing and coordinating traffic signals -- A coordinated series of traffic signals minimizes the excessive stop-and-go operation common with closely spaced signalized intersections. With adequate

spacing, coordinated signals increase street capacity by enabling traffic to flow at more uniform speeds.

Increasing concern over the world's diminishing natural resources is causing people to oppose highway improvements which take additional land and increase the total number of vehicles on the roads. Travel demand management increases street capacity by changing people's travel patterns, without building new roads and without significantly increasing environmental damage. The following policies are part of travel demand management:

1. Encourage people to form carpools and vanpools. Increasing the number of people in each vehicle reduces the number of vehicles on the road and increases the people carrying capacity of the street system.
2. Encourage people to walk. Elkin, Jonesville and Arlington's pleasant community atmosphere and nice climate make walking fun, easy, and safe. Getting people out of their cars and on to the sidewalks changes auto-oriented business areas into friendly people-oriented community areas.
3. Encourage people to ride bicycles. Every person who rides a bicycle instead of driving removes one car from the street network. In addition, bicycle riding does not deplete our planet's protective ozone layer.
4. Encourage industries, businesses, and institutions to stagger work hours or establish variable work hours for employees. Variable work hours spread the morning and afternoon peak travel over a longer time and increase the street's daily traffic capacity.
5. Encourage land use development in a more pedestrian oriented manner. Avoid imprisoning citizens to automobiles for daily necessities. Allow citizens

to choose whether to drive or not by providing appropriate sidewalks and bicycle facilities.

SYSTEM EFFICIENCY

Any system is only as good as each of its parts. For example, an automobile - no matter how expensive, no matter how powerful, or how high the speedometer scale - if one tire is flat, the car will not go fast. Street networks operate the same way. If one important link is missing, the whole network is burdened with unnecessary traffic. Every street has a particular functional classification which is important to the entire street system. An efficient system reduces travel distances, travel time, and travel costs.

Functional Classification

Streets have two primary functions, traffic service and land access. Traffic service involves moving many high speed vehicles; land access involves slow moving vehicles turning into driveways. Combining slow turning vehicles with high speed traffic creates significant conflicts. The conflicts are not serious if both traffic service and land access demands are low. However, when traffic volumes increase, conflicts cause intolerable traffic congestion and serious safety hazards. The thoroughfare plan designates a functional system of streets which minimizes these problems. Streets are categorized as local access streets, minor thoroughfares, or major thoroughfares.

Local access streets provide access to abutting property. Depending on the land use, local streets may be subclassified as residential, commercial, or industrial. Local streets should not carry heavy volumes of traffic, and by design, they should discourage unnecessary traffic.

Minor thoroughfares connect local access streets to the major thoroughfares. They provide some access to abutting property, but they should be protected enough to allow a safe traffic flow to the major thoroughfares. Designing minor thoroughfares to serve limited areas protects them from excessive traffic.

Major thoroughfares are the primary traffic arteries of the town. Although they may serve abutting property, their principle function is to carry large volumes of traffic. Uncontrolled strip development significantly lowers their capacity because each driveway impedes the traffic flow. Similarly, on-street parking should be avoided because it also impedes the traffic flow.

Ideal Small Urban Thoroughfare System

An ideal thoroughfare system coordinates local streets, minor thoroughfares, and major thoroughfares into a radial-loop pattern. The radial-loop arrangement provides direct access between all municipal areas. Figure 2 shows how radial streets, cross-town streets, loop streets, and bypasses work together.

Similar to the spokes on a bicycle tire, radial streets run from outside the planning area to inside the planning area. Radial streets are major thoroughfares which provide traffic movement between points located on the outskirts of the city and the central area. This major traffic movement provides economic strength in the central business district.

Cross-town streets and a loop around the central business district prevent the traffic congestion caused by all the radial streets converging at one location. Cross-town streets provide convenient access to the local businesses and merchants. Traffic destined for downtown can

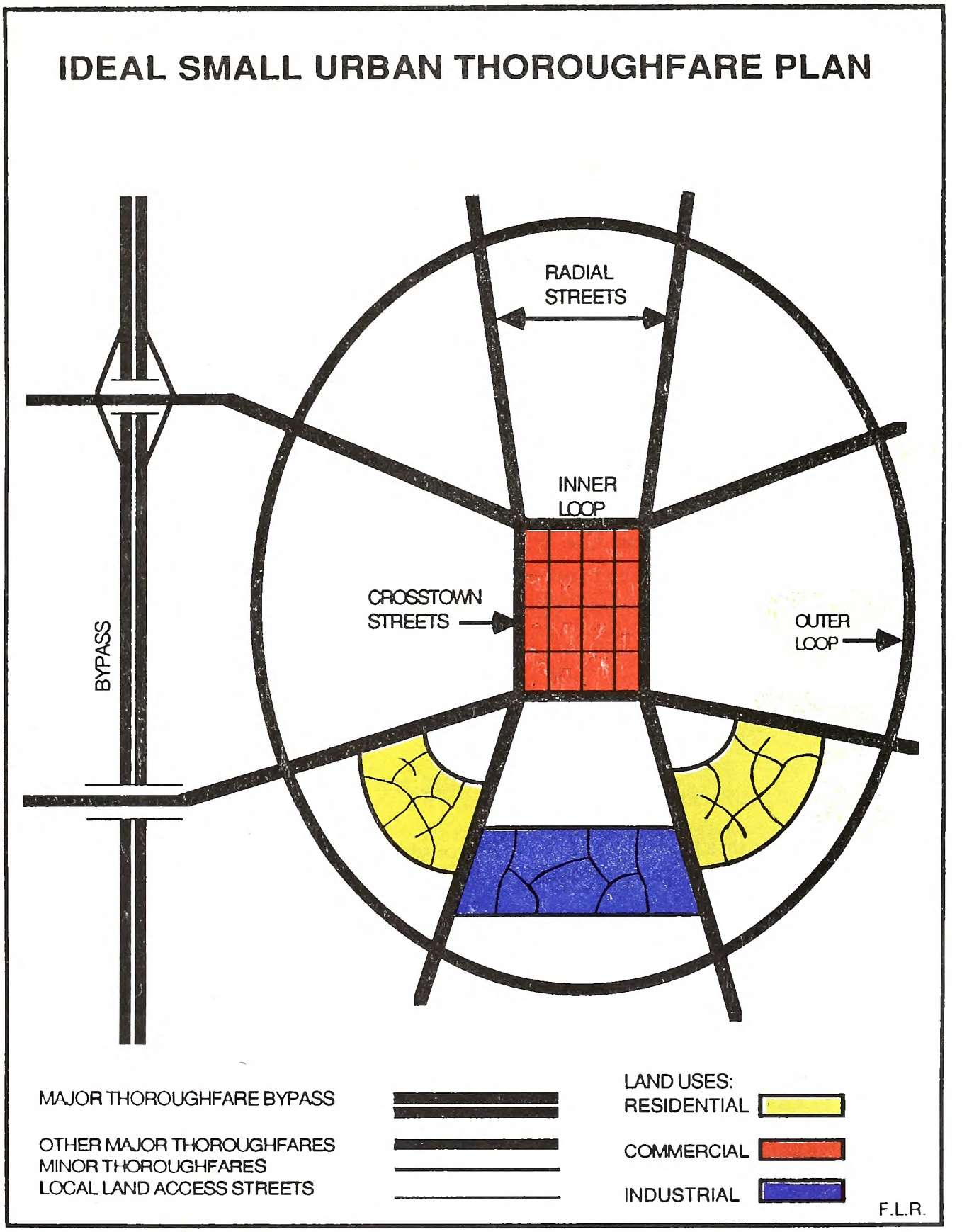

IDEAL SMALL URBAN THOROUGHFARE PLAN
RADIAL STREETS
INNER LOOP
CROSSTOWN STREETS
OUTER LOOP
BYPASS
MAJOR THOROUGHFARE BYPASS
OTHER MAJOR THOROUGHFARES
MINOR THOROUGHFARES
LOCAL LAND ACCESS STREETS
LAND USES:
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
F.L.R.

FIGURE 2

circle on the loop, and then enter downtown near its destination. Local traffic not destined for downtown can drive around the loop. This cross-town system removes unnecessary traffic from the downtown and enhances the business and shopping atmosphere.

Loop streets connect suburban areas together. As people and businesses move away from the central business areas to the suburbs for cheaper land and lower taxes, many commuters drive from one suburb to another, without stopping downtown. The outer loop moves traffic between suburban areas avoiding the downtown altogether. Depending on the size of the urban area, more loops may be necessary; they should be spaced one-half mile to one mile apart.

A bypass carries through traffic around the urban area and removes it from the city street system. Bypasses are designed with controlled access to move through traffic quickly, not to access property. Occasionally, a bypass can function as a portion of an urban loop. By freeing the local streets for shopping and home-to-work traffic, bypasses typically increase the economic vitality of the local area.

PRACTICAL APPLICATIONS

The ideal radial-loop thoroughfare plan is a great goal, but most urban areas cannot attain this "ideal" thoroughfare plan. In practice, all urban areas have natural constraints which complicate the thoroughfare planning process. These constraints include: existing land uses, existing streets, existing developments, public attitudes, local politics, and future development projections. During the thoroughfare planning process, a transportation engineer analyzes the critical constraints to determine the best mix of existing and proposed roads.

III. EXISTING CONDITIONS

Elkin, Jonesville, and Arlington have invested valuable time and money in their street system over the past century. Development patterns along the streets in the central business district and local neighborhoods have established a unique local character. Developing a thoroughfare plan requires detailed information on this local character and other existing local conditions. Existing roads, population trends, traffic accidents, travel demand, and street capacity are all important considerations.

EXISTING ROADS

Interstate 77 serves Elkin, Jonesville, and Arlington by providing direct access to the entire Interstate Highway network. Interstate 77 extends from South Carolina to Ohio. In addition, several other US and NC designated routes serve the planning area. US 21 connects Elkin, Jonesville, and Arlington to Statesville in the south and the Blue Ridge Parkway to the north. NC 268 provides access to North Wilkesboro in the west and Level Cross in the east. NC 67 extends east from Jonesville to Booneville.

Eight streets (US 21 Business, NC 268, NC 67, Bethel Church Road, C. C. Camp Road, Center Road, Murray Road, and Swan Creek Road) are all major thoroughfares which serve as radial streets. Lined with residential and commercial parcels of land, these radial streets have both traffic flow and land access functions. Swan Creek Bypass serves as a partial loop connecting the radial streets NC 67, US 21, Swan Creek Road, and Bethel Church Road. Because Swan Creek Bypass does not connect Jonesville and Arlington with Elkin

by extending across the Yadkin River, local traffic must use either Bridge Street or Gwyn Avenue to travel between the communities.

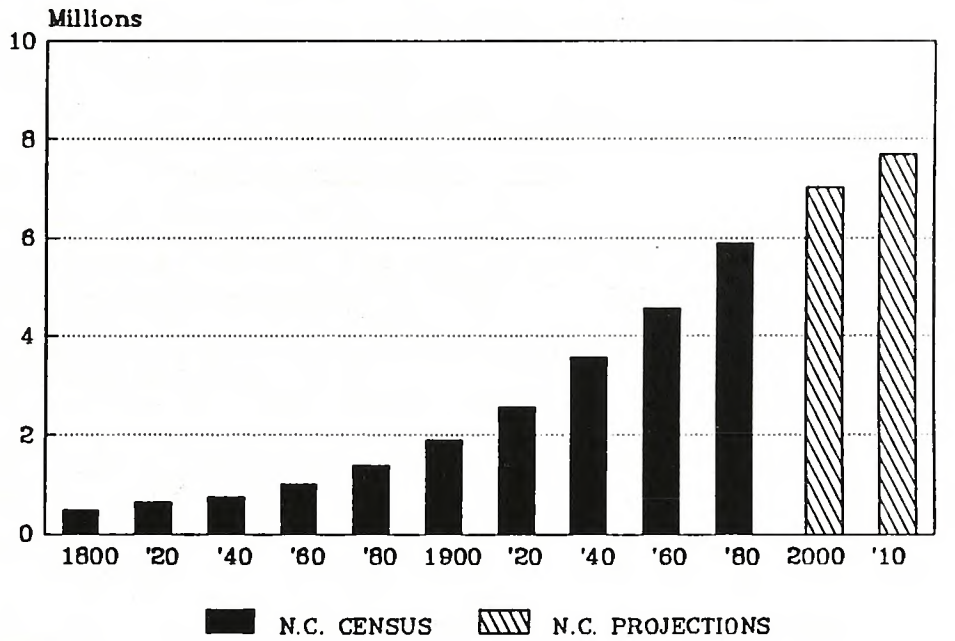
POPULATION TRENDS

Population directly relates to automobile traffic in three different ways. First, the number of automobiles owned and driven in the planning area increases as the population increases. Second, the number of people driving into the planning area increases as the number of businesses in the planning area increases. Third, the number of trips passing through the planning area increases as the population of surrounding communities increases.

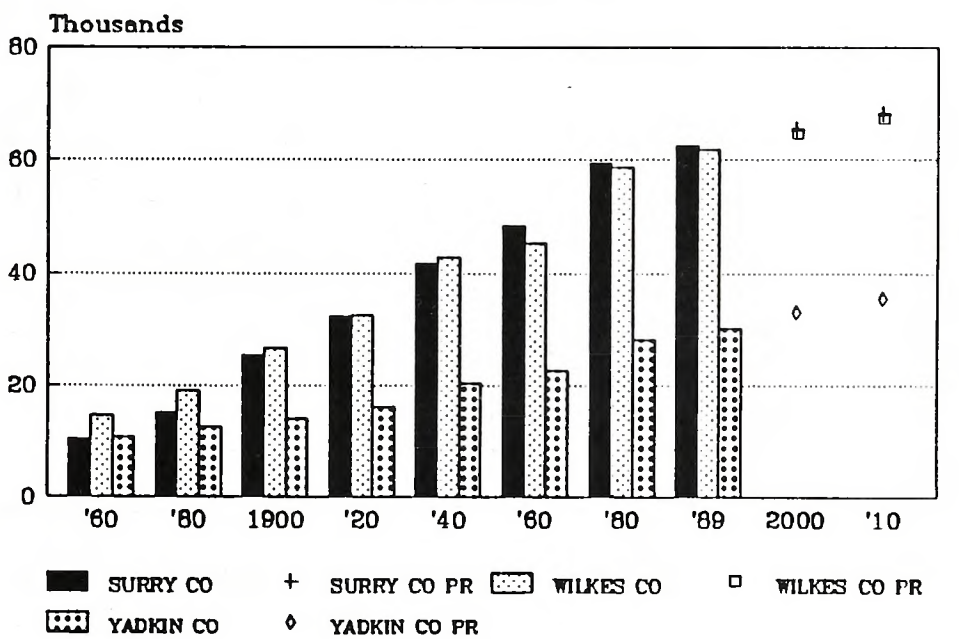
Based on information contained in the document *North Carolina Population Projections: 1988-2010* published by the Office of State Budget and Management, North Carolina is projected to grow at an average rate of 0.9% per year. Figure 3 illustrates North Carolina's population trends and projections. Surry, Wilkes, and Yadkin counties are projected to grow at 0.4%, 0.4%, and 0.75% respectively. Figure 4 illustrates the three counties' population trends and projections. Although Arlington's growth trend over the past 50 years has been slowly increasing, Jonesville's population trend has been effectively constant, and Elkin's population trend increased sharply during the past decade. Figure 5 illustrates the population trends for Elkin, Jonesville, and Arlington.

Based on the local, county, and state population trends, the planning area growth rate was estimated to be 0.5% per year. Figure 6 shows how this rate (plus or minus 0.1%) will increase the planning area population by the year 2010. Because the thoroughfare planning area boundary extends

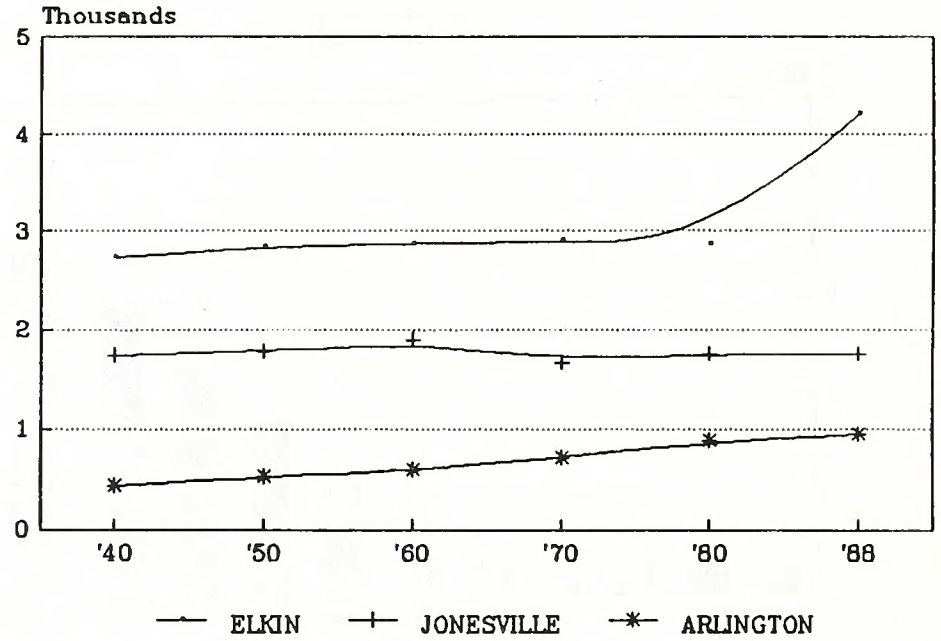
NC POPULATION TRENDS
FIGURE 3



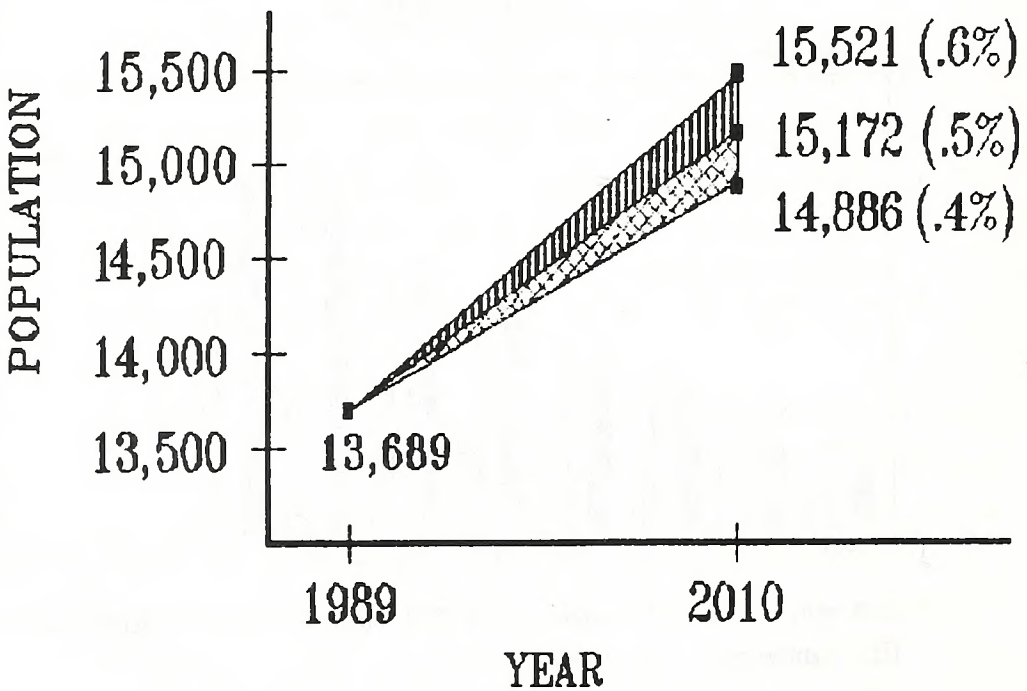
COUNTY POPULATION TRENDS
FIGURE 4



LOCAL POPULATION TRENDS
FIGURE 5



PLANNING AREA POPULATION FORECAST
FIGURE 6



beyond the existing town limits, the 1989 and 2010 populations include the people between the existing municipal limits and the planning area boundary.

TRAFFIC ACCIDENTS

Traffic accidents cost all insured North Carolina citizens hundreds of dollars each year in automobile insurance premiums. Traffic accidents are attributed to three general causes: driver characteristics, vehicle characteristics, and environmental characteristics. Driver characteristics include driving ability, mental alertness, and reaction time. Vehicle characteristics include vehicle type, vehicle condition, and vehicle responsiveness. Environmental characteristics include road conditions, weather conditions, physical obstructions, and traffic conditions.

All traffic accidents listed in the Division of Motor Vehicles' files from January 1985 through December 1989 in the planning area were analyzed. Table 1 lists all intersections with ten or more accidents during the past five years and Figure 7 illustrates the most frequent accident locations. The intersection of Bridge Street with Oakland Drive tops the list with 28 accidents. Almost two-thirds of the highest traffic accident locations occurred along Bridge Street. Consequently, thoroughfare planning can help reduce these accidents by encouraging traffic not destined for Bridge Street to use alternative routes.

TABLE 1
ELKIN-JONESVILLE-ARLINGTON ACCIDENT INVENTORY

Intersections with 10 or more accidents occurring between January 1985 and December 1989 are listed.

LOCATION	NUMBER OF ACCIDENTS
Bridge Street & Market Street	28
Bridge Street & Collins Road	19
Gwyn Ave. & Market Street	19
I-77 & NC 67	19
Bridge Street & Highland Avenue	15
Bridge Street & Oakland Drive	15
Church Street & Spring Street	13
Front Street & Main Street	12
Bridge Street & C. C. Camp Road	11
Bridge Street & Chatham Drive	11
Bridge Street & Gwyn Avenue	11
Bridge Street & Main Street	11
Bridge Street & Standard Street	11
Church Street & Market Street	11
NC 268 & Oakland Drive	11
Bridge Street & Hawthorn Road	10

ACCIDENT LOCATIONS
1985 - 1989

LEGEND

- INTERSECTIONS WITH 10 - 14 ACCIDENTS
- INTERSECTIONS WITH 15 - 20 ACCIDENTS
- INTERSECTIONS WITH > 20 ACCIDENTS

(INTERSECTIONS WITH LESS THAN 10 ACCIDENTS ARE NOT SHOWN)

ELKIN
AND VICINITY

SURRY, WILKES AND YADKIN COUNTIES

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS – PLANNING AND RESEARCH BRANCH

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

FIGURE 7

TRAVEL DEMAND

Have you ever traveled on a busy Interstate and wondered where all the other thousands of cars were going? Travel demand is the technical term for analyzing this question. The name comes from the concept of people wanting to "travel" and "demanding" the road adequately handle all the traffic. Existing travel demand is reported as average daily traffic. Average daily traffic is the average amount of traffic which passes a particular point on the road in a typical day. Figure 8 shows where traffic counts were taken in Elkin, Jonesville, and Arlington to analyze the existing travel demand.

Future travel demand was estimated with a computer transportation model using *TRANPLAN* software. The computer model analyses all of the automobile trips inside a planning area in three separate groups: through trips, external trips, and internal trips. Through trips were estimated using the procedures documented in *Technical Report #3: Synthesized Through Trip Table For Small Urban Areas.* Once the model accurately estimated the existing traffic patterns, socio-economic data projections were used in the computer model to estimate the 2010 traffic on the street network. Appendix C details the computer modeling data.

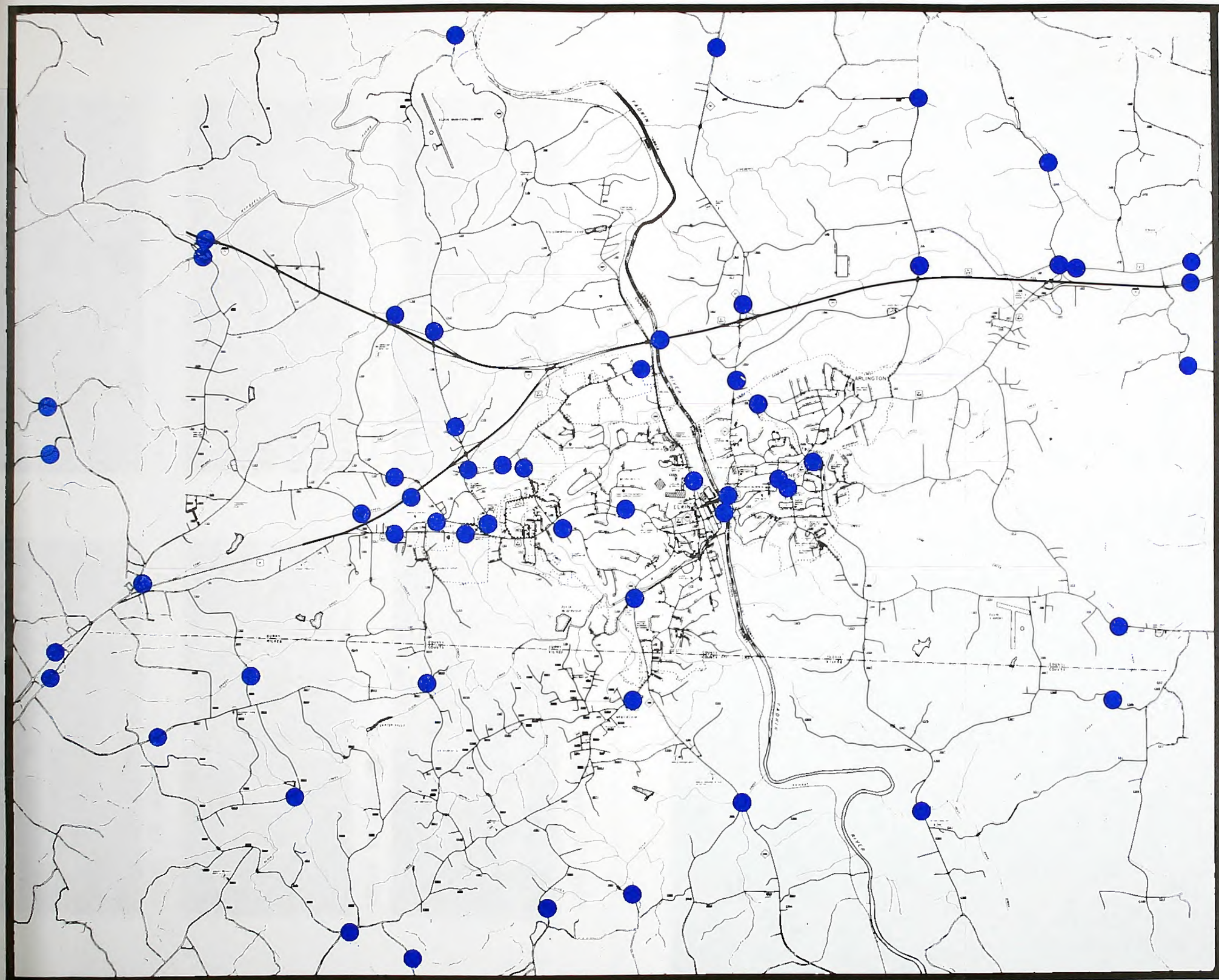
CAPACITY ANALYSIS

The maximum number of vehicles that can drive on a street at the same time is called the street's traffic capacity. Unlike the definite "capacity" of a glass holding water, the "capacity" of a street includes a variable element based on driver acceptance. People will not accept bumper-to-bumper traffic 24 hours a day, but they will accept bumper-to-bumper traffic for a short time. People accept different street capacities based on expected "level of

service." Figure 9 illustrates the traffic conditions for six typical levels of service:

1. Level-of-service "A" describes free flow operations. People can choose a desirable speed and maneuver easily in the traffic stream.
2. Level-of-service "B" describes almost free flowing operations. People can drive at posted speeds and are only slightly restricted maneuvering in the traffic stream.
3. Level-of-service "C" describes stable operations. Many vehicles have to drive at the same speed because of moderately restricted maneuverability. Motorists experience some tension from driving.
4. Level-of-service "D" describes acceptable congestion during rush hour. Most vehicles have to drive slightly below the posted speed because of restricted maneuverability. Motorists experience noticeable driving tension.
5. Level-of-service "E" describes congested rush hour conditions. All vehicles have to drive below the posted speed because maneuvering is very difficult. Tense motorists often become annoyed waiting at traffic signals and feel fatigued after driving.
6. Level-of-service "F" describes a traffic jam. Vehicles are subject to stop-and-go traffic because maneuvering is seemingly impossible. Intersection congestion and delays are common. Tense motorists, annoyed at traffic signals and irritated with the other "incompetent" drivers, feel angry after driving.

The thoroughfare plan recommendations are based on a minimum level-of-service D. Although most people prefer a better level of service, level-of-service D is the highest level of service people are willing to fund. Figure 10 illustrates the sections of NC 268, Bridge Street, and C. C. Camp Road which will experience future capacity problems.



TRAFFIC COUNT LOCATIONS

LEGEND

COUNTER LOCATION

ELKIN

AND VICINITY

SURRY, WILKES AND YADKIN COUNTIES

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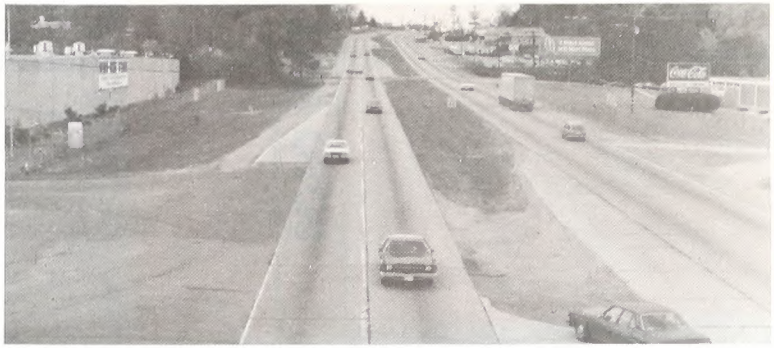
FEDERAL HIGHWAY ADMINISTRATION

SCALE

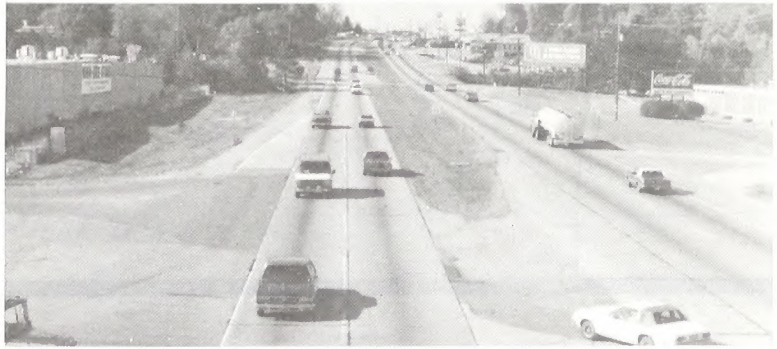
1" = 4,000'

FIGURE 8



LEVEL OF SERVICE - A

LEVEL OF SERVICE - D



LEVEL OF SERVICE - B

LEVEL OF SERVICE - E

LEVEL OF SERVICE - C

LEVEL OF SERVICE - F

LEVELS OF SERVICE

FIGURE 9

2010 ROADS OVER CAPACITY

LEGEND

0000 · 2010 AVERAGE DAILY TRAFFIC

TRAFFIC NEAR OR OVER CAPACITY

ELKIN

AND VICINITY

SURRY, WILKES AND YADKIN COUNTIES

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FEDERAL HIGHWAY ADMINISTRATION

SCALE

FIGURE 10

IV. MUNICIPAL AND PUBLIC INVOLVEMENT

In today's complex democratic society, creating a thoroughfare plan requires working with many different people. Often thoroughfare planning involves: transportation planning engineers, roadway design engineers, community planners, environmental specialists, federal agencies, state agencies, local officials, and local citizens. Elkin, Jonesville, and Arlington's thoroughfare planning process began when Elkin requested the Department of Transportation for assistance updating the June 9, 1983 Elkin-Jonesville-Arlington Thoroughfare Plan.

In September 1989, Elkin and Jonesville passed resolutions agreeing to cooperatively update the 1983 Thoroughfare Plan with the Department of Transportation. The Department of Geography and Planning from Appalachian State University collected the housing, employment, and street inventory data. After the data was presented to the three communities on February 12, 1990, Department of Transportation engineers constructed a computerized traffic model for the planning area.

On January 23, 1991, representatives from Elkin, Jonesville, and Arlington's Town Boards and representatives of the Elkin-Jonesville Chamber of Commerce met with Department of Transportation engineers. Development and calibration of the computerized transportation model for the planning area was discussed. After reviewing the socio-economic data projections for the year 2010, local officials expressed concern over the low growth projected for Jonesville and Arlington.

Considering the comments from the local representatives, Department of Transportation engineers analyzed the traffic consequences from slightly increasing growth projections in Jonesville and Arlington. The analysis demonstrated that increasing the growth rates slightly in Jonesville and Arlington would not affect thoroughfare plan recommendations. On March 19, 1991, Department of Transportation engineers discussed this information with representatives from the local Town Boards and representatives of the Elkin-Jonesville Chamber of Commerce. Local representatives requested a slight increase in the growth projections for Jonesville and Arlington.

On April 16, 1991, Department of Transportation engineers met with representatives from Elkin, Jonesville, and Arlington's Town Boards and representatives of the Elkin-Jonesville Chamber of Commerce. The alignments of thoroughfare plan proposals were discussed. After everyone's questions and ideas were discussed, local representatives endorsed a recommended thoroughfare plan for the public to review.

During the afternoon of May 14, 1991, Elkin, Jonesville, and Arlington citizens were invited to a public drop-in session with Department of Transportation engineers. Only two citizens stopped by to make comments and ask questions about the recommended thoroughfare plan.

After a joint Elkin, Jonesville, and Arlington public hearing on May 14, 1991, the Elkin Board of Commissioners adopted the Thoroughfare Plan map dated May 1991. The Jonesville Town Council and the Arlington Town Council adopted the May 1991 Thoroughfare Plan map at their June 3, 1991 council meetings. Subsequently, the North Carolina Department of Transportation adopted the plan on October 11, 1991.

V. RECOMMENDATIONS

Figure 11 illustrates the thoroughfare plan mutually adopted by Elkin, Jonesville, Arlington and the North Carolina Department of Transportation. Appendix A tabulates existing statistics and Department of Transportation recommendations for the ultimate cross-sections of the thoroughfares shown on the thoroughfare plan. The estimated 2010 average daily traffic is based on the thoroughfare plan street network, not the existing street network. Appendix B illustrates typical thoroughfare cross-sections referenced in Appendix A. This chapter discusses thoroughfare plan recommendations in detail. Recommendations are organized by functional classification and ideal thoroughfare purpose in four categories: major thoroughfare bypasses, major radial thoroughfares, major thoroughfare loops, and minor thoroughfares.

MAJOR THOROUGHFARE BYPASSES

Interstate 77, US 21 Bypass, and the proposed NC 268 Bypass are all major thoroughfare bypasses. Interstate 77 is the most efficient type of thoroughfare bypass because it is part of the Interstate Highway System which is designed for high speed traffic movement. US 21 Bypass, which uses part of Interstate 77, is also designed for high speed traffic movement. The proposed NC 268 Bypass will provide through traffic an efficient connector between NC 268 west of Elkin and Interstate 77 and US 21 east of Elkin. (See "NC 268" in the section on Major Radial Thoroughfares for more information on the NC 268 Bypass). All three of these facilities are intended to serve primarily through traffic and not provide direct land access.

MAJOR RADIAL THOROUGHFARES

Eight streets (US 21 Business, NC 268, NC 67, Bethel Church Road, C. C. Camp Road, Center Road, Murray Road, and Swan Creek Road) are all major thoroughfares which serve as radial streets. These major thoroughfares are the primary traffic arteries of the town. Although they may serve abutting property, their principle function is to carry larger volumes of traffic. These radial thoroughfares provide Elkin, Jonesville, and Arlington's economic vitality by carrying traffic from outside of the communities to inside the communities. For this area to remain economically competitive, each road should be protected as an important transportation corridor. When practical, all major radial thoroughfares should be widened to have twelve foot paved travel lanes.

US 21 Business

US 21 Business (also designated as Bridge Street in Elkin and Jonesville, and Main Street in Arlington) ties each community together. US 21 Business from Interstate 77 in Yadkin County to Oakland Drive in Surry County has enough additional capacity to handle the future traffic growth over the next twenty years. However, Bridge Street from Oakland Drive to the Armory will have future traffic congestion problems. As Elkin, Jonesville, and Arlington expand and additional traffic signals are installed on US 21 Business, the traffic capacity will decrease. Each additional traffic signal adds to the total travel time and travel friction experienced by drivers on US 21 Business.

The North Carolina 1991-1997 Transportation Improvement Program has scheduled right-of-way protection for widening Bridge Street to a multi-lane facility from Oak Grove Road to US 21 Bypass. However, increasing capacity from Oakland

LEGEND

	EXISTING	PROPOSED
MAJOR THOROUGHFARE FREEWAYS		
MAJOR THOROUGHFARE OTHERS		
MINOR THOROUGHFARES		

ADOPTED BY THE TOWN OF ELKIN	MAY 13, 1991
ADOPTED BY THE TOWN OF JONESVILLE	JUNE 3, 1991
ADOPTED BY THE TOWN ARLINGTON	JUNE 3, 1991
RECOMMENDED FOR APPROVAL BY THE PLANNING AND ENVIRONMENTAL BRANCH	SEPTEMBER 5, 1991
ADOPTED BY THE THE N. C. DEPARTMENT OF TRANSPORTATION	OCTOBER 11, 1991
PUBLIC HEARING	MAY 13, 1991

FIGURE 11

THOROUGHFARE PLAN

ELKIN JONESVILLE ARLINGTON

SURRY, WILKES AND YADKIN COUNTIES

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS - PLANNING AND ENVIRONMENTAL BRANCH

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1500 3000

MAY 1991

Drive to Collins Road by adding new lanes may not be practical since this section of road was recently widened to three lanes. The thoroughfare plan uses a loop facility to divert unnecessary traffic from the congested section of US 21 Business to other facilities. Consequently, when the proposals on the thoroughfare plan are constructed, traffic on US 21 Business will decrease.

NC 268

NC 268 connects Elkin to North Wilkesboro and passes through downtown Elkin. Vehicles traveling between NC 268 in West Elkin and the US 21 Bypass or Interstate 77 east of Elkin must drive along Oakland Drive, Bridge Street, and Oak Grove Road. During the next twenty years, this through traffic winding through town will contribute to traffic congestion on NC 268, Bridge Street, and Oak Grove Road. Due to the travel pattern, existing topography and existing land uses, increasing capacity by adding new lanes to NC 268, and Bridge Street, and Oak Grove Road may not be feasible. The proposed NC 268 Bypass will divert through traffic from the congested roadways.

The North Carolina 1991-1997 Transportation Improvement Program has scheduled widening C. C. Camp Road to a multi-lane facility from US 21 Bypass to Interstate 77. Project planning, design, and right-of-way acquisition are scheduled for Federal Fiscal Years 1994, 1995 and 1996 respectively. Construction is not scheduled yet. In addition, the North Carolina 1991-1997 Transportation Improvement Program has scheduled a new two-lane road on four lanes of right-of-way from NC 268 in Wilkes county to US 21 Bypass in Surry County for right-of-way protection. Project planning, design, and construction are not currently scheduled.

NC 67, Bethel Church Road, C. C. Camp Road, Center Road, Murray Road, and Swan Creek Road

NC 67, Bethel Church Road, C. C. Camp Road, Center Road, Murray Road, and Swan Creek Road between the planning area boundaries and the municipal limits will get increasing development pressure as the area grows. Although additional traffic signals will reduce each road's traffic capacity, the existing roadways should have adequate traffic capacity for the next twenty years. These transportation corridors should be protected for traffic movement.

MAJOR LOOP THOROUGHFARES

Elkin, Jonesville, and Arlington's street system lacks a continuous loop around all three communities. Without this necessary part of the street system radial streets and neighborhood streets carry unnecessary traffic. Loop system streets allow direct travel between suburban areas of town by connecting major radial streets. When loop system streets are available, people can drive directly to their destination instead of winding through local subdivisions or commercial streets.

Elkin, Jonesville, and Arlington should have a two-lane, 24-foot wide roadway with 100 feet of right-of-way for the loop facility. Swan Creek Bypass from NC 67 to Bethel Church Road can be combined with new two-lane roads to form an effective loop. The thoroughfare plan shows Swan Creek Bypass extending across the Yadkin River to Elkin on the east and west sides of the planning area. The proposed western road extends Swan Creek Bypass from Bethel Church Road across the Yadkin River to NC 268 at the intersection where proposed NC 268 Bypass will begin.

The proposed eastern road extends Swan Creek Bypass from NC 67 across the Yadkin River to NC 268 approximately 0.16 miles east of Brookwood Street. Ideally, the proposed eastern extension could line up with Brookwood Street or Johnson Ridge Road. Chatham Park, the Chatham Knits Building, and a small creek prevent aligning the proposed extension up with Brookwood Street. The proximity of the Yadkin River to the rail road tracks and NC 268 make lining up the proposed eastern extension with Johnson Ridge Road difficult and probably cost prohibitive.

In addition to providing an effective loop connecting the three communities, the two proposed river crossings will also provide relief for the existing Gwyn Avenue Bridge. The Gwyn Avenue Bridge, built in 1931, is a reminder of the area's local history. Partially covered with an antique steel truss and bordered with a concrete railing uncommon today, the bridge has a certain nostalgia. Unfortunately, on a bridge sufficiency rating scale from 0 to 100 (with 100 being the best) the Gwyn Avenue Bridge has a rating of two. This low sufficiency rating does not mean the bridge is unsafe, it means that under existing conditions the bridge ranks very low compared to current design and safety standards.

MINOR THOROUGHFARES

Seventeen roads are designated as minor thoroughfares. These roads connect local land access streets with major thoroughfares. Two lanes should have enough traffic capacity to handle design year traffic. Since minor thoroughfares serve traffic movement and land access, minor thoroughfares do not necessarily need to have full twelve-foot lanes. Land use, neighborhood character, aesthetic quality, bicycle traffic, and pedestrian traffic will influence the

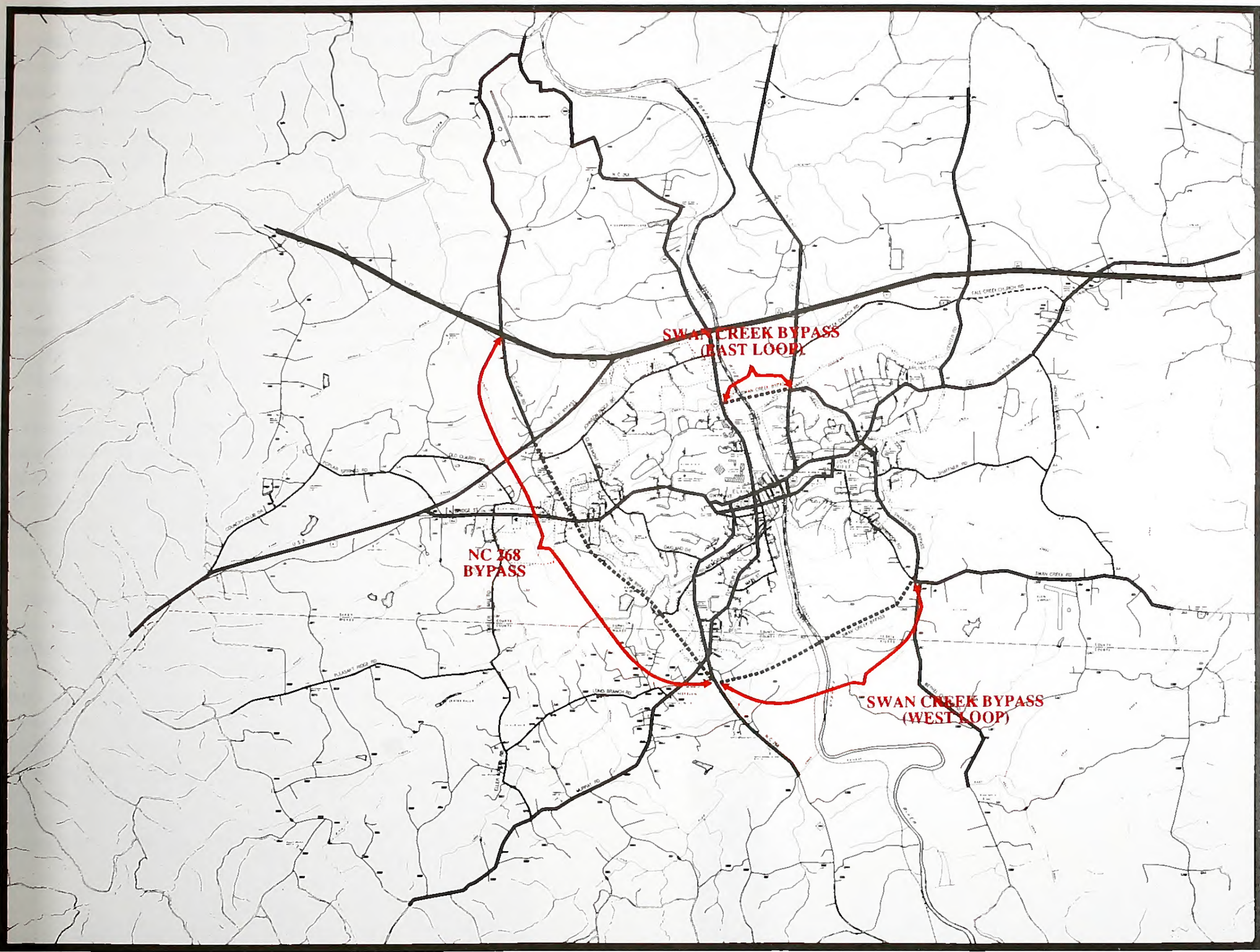
appropriate right-of-way and pavement widths. By planning for twelve-foot pavement widths, future policy makers will have the flexibility to choose the most appropriate pavement width. On-street parking and on-street bicycle lanes require additional pavement width. Local subdivision ordinances should address these issues for minor thoroughfares (in addition to major thoroughfares and local streets).

PROJECT BENEFITS

Elkin, Jonesville, and Arlington's Thoroughfare Plan contain several proposed thoroughfares. Each recommendation affects different transportation users, and each recommendation has different costs and benefits. This section of the report quantifies the positive and the negative aspects of each project. The analysis is based on *Technical Report #8: Transportation Project Evaluation Using The Benefits Matrix Model* published by the Statewide Planning Branch of the Department of Transportation. This analysis provides general information on the relative significance of each project to Elkin, Jonesville, and Arlington's Thoroughfare Plan.

Figure 12 illustrates how the major thoroughfare recommendations are grouped into three distinct projects. Although individual links in these projects may be constructed independently, the street system's benefits will not be significant until the entire project is completed. Each project's benefits are determined by comparing the traffic on the existing street network with traffic on the thoroughfare plan network. A more detailed cost and benefit analysis should be conducted on individual projects when the traffic demand exists and Elkin, Jonesville, and Arlington request a feasibility study.

FIGURE 12



N

	EXISTING	PROPOSED
MAJOR THOROUGHFARE FREEWAYS		
MAJOR THOROUGHFARE OTHERS		
MINOR THOROUGHFARES		

BENEFITS ANALYSIS PROJECTS

ELKIN
JONESVILLE
ARLINGTON

SURRY, WILKES AND YADKIN COUNTIES

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS - PLANNING AND ENVIRONMENTAL BRANCH

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1500 3000

MAY 1991

Table 2 shows the results from this analysis. Column two shows the monetized project benefits. Project benefits include vehicle operating cost savings, travel time cost savings, and accident cost savings. Cost savings were calculated by comparing how much existing and future traffic would shift to use the proposed project.

Column three shows the project cost estimates. The cost estimates are based on average cost-per-mile construction information from across North Carolina. Because these cost estimates are not particular to Elkin, Jonesville, and Arlington or to specific roadway design plans, the actual construction costs may be significantly different. The costs listed in the table are useful for illustrating the relative cost difference between alternative projects.

Economic impacts are listed in the fourth column. The probability of economic development enhanced by the project is ranked on a continuous scale from low to high. Projects which have a minimal probability of economic development have a value of zero. Projects which have a high probability of economic development have a value of one.

Environmental impacts are listed in the fifth column. Impacts ranging from very negative to very positive correspond to values ranging from negative one to positive one. Physical environment considerations include: air pollution, water pollution, land pollution, noise pollution, geological resources, wildlife habitats, and natural vegetation. Social environmental considerations include: housing, neighborhoods, schools, churches, parks, public safety, national defense, and aesthetics. Each of these standard environmental factors are ranked and averaged for each project to generate the value listed in the table.

TABLE 2: PROJECT COMPARISON SUMMARY

Project Description	Benefits (Millions)	Cost (Millions)	Economic Impacts	Environmental Impacts	Through Trips
Proposed NC 268 Bypass	$21.4	R/W $ 6.6 Const $ 10.7 --- Total $ 17.3	0.25	-0.61	3,400
Proposed Swan Creek Bypass (West Loop)	$13.9	R/W $ 0.05 Const $ 4.4 --- Total $ 4.5	0.50	-0.54	100
Proposed Swan Creek Bypass (East Loop)	$17.5	R/W $ 0.02 Const $ 2.6 --- Total $ 2.6	0.25	-0.46	100

The average daily through trips in the design year are listed in the last column. The number of through trips indicate the significance the project will have on the State Arterial system. Projects which have high volumes of through traffic are more important to the State Arterial system. Projects which have very few through trips are more important to the local street system.

NC 268 Bypass

Constructing the NC 268 Bypass involves two separate links: constructing a new two-lane road on four lanes of right-of-way from NC 268 in Wilkes county to US 21 Bypass in Surry County, and widening C. C. Camp Road to a multi-lane facility from US 21 Bypass to Interstate 77. Cost estimates are based the results from a 1990 Feasibility Study conducted by the Planning and Environmental Branch of the Department of Transportation.

Swan Creek Bypass (West Loop)

This project involves constructing a new two-lane road from Bethel Church Road to NC 268. Cost estimates are based on a twenty-four foot wide road with shoulders and a 1500-foot long bridge.

Swan Creek Bypass (East Loop)

This project involves constructing a new two-lane road from NC 67 to NC 268. Cost estimates are based on a twenty-four foot wide road with shoulders and a 1000-foot long bridge.

VI. IMPLEMENTATION

Elkin, Jonesville, and Arlington's Thoroughfare Plan is a detailed set of recommendations for how the communities should develop a street system to keep up with the area's growth. Because there are no guarantees the area will develop as planned, anticipated traffic growth and future capacity deficiencies may change. Before any of the proposed roads will be considered for construction, a detailed project study will determine if actual development justifies the projects. Environmental studies and design studies will determine specific road alignments.

No one in the Department of Transportation has the job of implementing the recommendations listed in thoroughfare plans because funding is not available for building roads based on predicted need. Local officials are responsible for requesting projects as the need arises. With hundreds of municipalities competing for projects funded by the state's tight budget, Elkin, Jonesville, and Arlington must make well planned requests to be effective. The documented public and political involvement, in addition to technical feasibility, give thoroughfare plan project requests the competitive edge over all other requests.

REGULATIONS

Communities which actively protect their thoroughfare corridors have the best success actually getting projects constructed. Protecting thoroughfare corridors saves citizens hundreds of thousands and even millions of dollars each year. Thoroughfare Plan adoption, subdivision

regulations, future street line ordinances, zoning ordinances, development reviews, and official maps are regulations available to protect thoroughfare corridors.

Thoroughfare Plan Adoption

Section 136-66.2 of the North Carolina General Statutes provides guidelines for adopting a thoroughfare plan. After the municipality and the Department of Transportation cooperatively develop a thoroughfare plan, the plan may be adopted by the municipality and the Department of Transportation. Subsequently, the thoroughfare plan serves as the basis for future street and highway improvements.

Section 136-66.1 of the General Statutes requires the municipality and Department of Transportation to develop a Systems Responsibility Agreement for all thoroughfares included in the plan. After mutual plan adoption, the Department of Transportation will initiate street system responsibility negotiations. The Department of Transportation is responsible for facilities which serve primarily through traffic and external traffic. The municipality is responsible for facilities which serve primarily internal traffic. Facilities designated as a State responsibility will be constructed and maintained by the Division of Highways. Facilities designated as a municipal responsibility will be constructed and maintained by the municipality.

After the Systems Responsibility Agreement is adopted, the plan should be reviewed locally at least once a year. When significant changes are necessary, the municipality should request the Statewide Planning Branch of the Department of Transportation to update the thoroughfare plan. Depending on actual growth patterns, the plan should be formally updated once every five to ten years.

Subdivision Regulations

Subdivision regulations specify roadway width, right-of-way, and sight distances in new subdivisions. The Department of Transportation manual *Subdivision Roads: Minimum Construction Standards* documents the design, construction, and utility placement standards necessary for state maintained roads. Regulations are classified by road functions (local street, collector street, etc). Appendix D contains an example subdivision ordinance. These regulations minimize roadway safety hazards and maintenance costs. Municipalities must have developers construct roads to North Carolina subdivision road standards for the North Carolina Department of Transportation to accept and maintain the road. Roads not meeting state regulations must be constructed and maintained by local or private funding.

Elkin, Jonesville, and Arlington's proposed thoroughfares, especially the loop facility, depend on local officials actively using subdivision regulations. When a proposed subdivision conflicts with the thoroughfare plan, the municipalities should protect the transportation corridor. During the planning stage, the conflicting subdivision roads can be realigned and improved to match the thoroughfare plan. Developers who construct thoroughfare plan streets can benefit from local or state agency coordination. Developers who do not help build the thoroughfare plan improvements should dedicate the necessary road right-of-way. As a minimum, developers should reserve property needed for future road right-of-way.

Future Street Line Ordinances

Typically, by the time an existing road needs widening, houses and buildings line both sides of the road with no room to spare. Residents are understandably upset when widening

the road swallows their entire yard, or worse their whole house. Businesses are equally upset when widening the road eliminates their only customer parking spaces, or their entire office. Building setbacks based on the thoroughfare plan recommendations reduce this problem.

As time passes, existing buildings age; some are renovated, others are replaced with newer buildings. Simultaneously, new buildings fill in the land between established buildings as zoning density limits increase. With adequate setback requirements, all the buildings constructed or renovated after thoroughfare plan adoption can have space for road widening. Ultimately, when the road is widened, fewer property owners will be negatively affected.

Zoning Ordinances

Zoning is a legal device available for implementing a land use plan. Most legislation today is based on the U.S. Department of Commerce 1924 Standard Zoning Enabling Act. Zoning involves dividing a municipality into districts and regulating each district's population density, land use, open space, and other local concerns. Although zoning ordinances do not regulate street design or right-of-way, zoning directly influences transportation by protecting thoroughfare corridors and controlling transportation demand.

Zoning can control transportation demand by discouraging strip development zones along highways which create inefficient traffic flows. Isolated, single purpose businesses connected by highways congest the roads with people driving from one place to another for everyday activities. Driving to the grocery store for a loaf of bread and then driving to the post office to buy a roll of stamps

often takes more driving time than shopping time. Zoning business areas for campus developments instead of strip development reduces automobile traffic by eliminating unnecessary automobile trips.

Zoning can also reduce automobile traffic by encouraging walking or bicycling. Just as shopping malls encourage people to walk from one shop to another, other developments can encourage people to walk from one business to another. Sidewalks should connect office complexes with lunch time eating and shopping areas. Neighborhoods, schools, libraries, and parks should also have connecting sidewalks and bicycle paths so people can choose their travel mode. Elkin, Jonesville, and Arlington's existing investment in sidewalks can provide an excellent base for developing a complete pedestrian system.

Development Reviews

Development reviews save developers and municipalities the headache of dealing with avoidable transportation related problems. Reviews done at an early stage often save developers and municipalities money and increase the site's accessibility. Depending on how the development will affect existing and future traffic, different Department of Transportation specialists review the development plans.

Since the developers usually contact the municipality first, the municipality should advise them to contact the District Engineer. The District Engineer reviews all requests for driveway access to State maintained roads. If necessary, the District Engineer will forward development requests to other Department of Transportation branches. If requested, the Statewide Planning Branch reviews all development requests on or near proposed thoroughfares and all requests which may prevent existing thoroughfares from

being widened in the future. The Traffic Engineering and Highway Design Branches review large traffic generating developments like shopping centers, large industries, and fast food restaurants. The District Engineer can be contacted by writing:

District Engineer
N.C. Department of Transportation
P.O. Box 558
Elkin, NC 28621

Official Maps

The North Carolina Statutes 136-44.50 through 136-44.53 are collectively designated as the "Roadway Corridor Official Map Act." This act gives state and municipal governments the power to protect transportation corridors based on official corridor maps. The official map which details the proposed thoroughfare alignment, the functional design, and the preliminary right-of-way boundaries is filed with the county Register of Deeds.

Roadway corridor maps may be adopted by the Department of Transportation or the municipality. The Department of Transportation makes official corridor maps only for fully controlled access facilities outside municipal jurisdiction. Municipalities must make official corridor maps for facilities without fully controlled access or facilities inside municipal jurisdictions. County Commissioners must approve municipal official corridor maps that extend beyond the municipality's extraterritorial jurisdiction.

Municipalities protect road corridors by prohibiting building permits or subdivision approvals on property within the corridor alignment. Because this places severe

restrictions on private property rights, land owners are sometimes compensated by having a reduced tax rate on any undeveloped or unsubdivided land within the transportation corridor.

Awkward legislation makes official corridor maps ineffective or inappropriate for most road corridors. Unless an environmental impact study or preliminary engineering study begins within one year of the official corridor map recording, the official map becomes legally void. If the environmental impact process is initiated, property restrictions only last up to three years, beginning when the developer requests permit or subdivision approval. Even if all other criteria are met, if federal funds are used, the environmental impact process chooses the road corridor with the least environmental damage, not necessarily the official map corridor.

The document *Guidelines for Municipalities Considering Adoption of Roadway Corridor Official Maps* has more details. Request this document from:

Program and Policy Branch
N.C. Department of Transportation
P.O. Box 25201
Raleigh, North Carolina 27611.

The Program and Policy Branch of the North Carolina Department of Transportation is responsible for coordinating Official Corridor Maps.

Regulation Coordination

Individually, thoroughfare plan adoption, subdivision regulations, zoning ordinances, development reviews, and official maps are all useful regulation tools. However, these regulations should be coordinated together to enhance their total effectiveness. Although each regulation applies

to different items, each regulation can support other regulations. Table 3 lists the regulations which should be coordinated for each thoroughfare plan project. Municipalities with coordinated regulations can transfer severable development rights as bargaining chips to attract and influence development in the community's best interest.

FUNDING

Almost every city, town, and village from the mountains to the coast would like some type of road improvements. Each year communities request funding for everything from new Interstates to bicycle paths. Right-of-way costs consume up to half of the total project costs. When municipalities can actively protect transportation corridors, reduce right-of-way costs and save North Carolina tax payers millions of dollars, Board of Transportation members notice.

Municipal Funding

Inside municipal corporate limits, municipalities are responsible for all local streets, all minor thoroughfares, and specially designated major thoroughfares. Thoroughfare plan recommendations should be incorporated in Elkin, Jonesville, and Arlington's Capital Improvement Program to match projected revenues with funds for street improvements. In addition to property taxes and Powell Bill money, municipal funds can be raised by impact fees and bond referendums.

Impact fees are a one-time tax paid by developers to help pay for negative impacts, such as traffic congestion, caused by new development. For example, impact fees can cover the additional public capital costs for widening

TABLE 3: PROJECT REGULATION COORDINATION					
Facility & Section	T-fare Plan	Subdivision Ordinance	Street Line Ordinance	Zoning Ordinance	Development Review
Fall Creek Church Road Center Rd. to US 21 Bus.	X	X		X	X
NC 268 Bypass I-77 to US 21 Bypass US 21 Byp. to US 21 Bus.	X X	X X		X X	X X
Swan Creek Bypass Bethel Church Rd. to NC 268	X	X		X	X
Swan Creek Bypass NC 67 to NC 268	X	X		X	X

TABLE 4: POSSIBLE PROJECT FUNDING SOURCES					
Facility & Section	Local Funds	TIP Funds	Secondary Road Funds	Industrial Access Funds	Small Urban Spot Improvement
Fall Creek Church Road Center Rd. to US 21 Bus.	X			X	
NC 268 Bypass I-77 to US 21 Bypass US 21 Byp. to US 21 Bus.		X X			
Swan Creek Bypass Bethel Church Rd. - NC 268		X			
Swan Creek Bypass NC 67 to NC 268		X			

streets to relieve traffic congestion caused by new construction. Well planned impact fees enable the town to minimize the lag time between when road improvements are needed and when road improvements are constructed.

The North Carolina General Statutes give municipalities authority to create municipal service districts to raise funds for capital improvements. Districts may float bond issues to facilitate traffic flow and parking. Bonds would be paid off with revenues from ad valorem taxes on all property within the district's boundaries. Once the improvements have been completed and the bonds retired, the extra tax would cease and the district would dissolve.

State and Federal Funding

The Department of Transportation, Division of Highways, is responsible for all state maintained roads outside municipal corporate limits. Inside municipal corporate limits, the Division of Highways is responsible for major streets and highways which carry primarily through traffic and traffic to major commercial, industrial, or governmental destinations. Division of Highways funds for the construction, maintenance, and improvements to the state road system can help implement thoroughfare plan recommendations.

North Carolina's Transportation Improvement Program (TIP) is a document which lists all major construction projects the Department of Transportation plans for the next seven years. Similar to local Capital Improvement Program projects, TIP projects are matched with projected funding sources. Each year when the TIP is updated, completed projects are removed, programed projects are advanced, and new projects are added (typically during the seventh year).

During annual TIP public hearings, municipalities request projects to be put in the TIP. A Board of Transportation member reviews all of the project requests in a particular area of the state. Based on the technical feasibility, need, and available funding, the board member decides which projects will be included in the TIP. In addition to highway construction and widening, TIP funds are available for bridge replacement projects, highway safety projects, public transit projects, railroad projects, and bicycle projects.

Non-TIP funds are also available for special purposes. The Department of Transportation has separate funds for paving secondary roads, building industrial access roads, and miscellaneous spot improvements in small urban areas. The Federal Government provides useful block grants such as urban renewal grants and demonstration project funding. Table 4 lists possible funding sources for implementing particular projects. Used in coordination with thoroughfare planning objectives, these other funding sources can make significant transportation improvements.

APPENDICES

APPENDIX A
ELKIN, JONESVILLE, & ARLINGTON ROUTE INVENTORY

Facility & Section	Existing Width (ft)	Existing # of Lanes	Existing R/W (ft)	Capacity CURRENT (FUTURE)	Volume 1990 ADT	Volume 2010 ADT	Recommended R/W WIDTH	Recommended ROAD TYPE
Bethel Church Rd. (Yadkin SR 1308)								
Cedarbrook Rd. - Yadkin Co. Line	18	2	60	9,000	500	1,100	100	J
Bethel Church Rd. (Wilkes SR 2307)								
Wilkes Co. Line - W.P.A.B.	20	2	60	10,000	200	400	100	J
N. Bridge St Ext (Elkin US 21 Bus)								
US 21 Byp - Hudson Ave (SR 1156)	22	2	150	14,000	6,900	8,900	ADQ	H
Hudson Ave. - Oak Grove Rd.	22	2	150	12,000	10,100	11,800	ADQ	H
N. Bridge St. (Surry US 21 Bus.)								
Oak Grove Rd. - Collins Rd.	60	5	150	26,000	11,800	12,300	ADQ	ADQ
Collins Rd. - Hawthorn Rd.	34	3	150	14,000	10,700	10,700	ADQ	ADQ
Hawthorn Rd. - Ridge St.	27	2	100	12,000	8,000	8,000	ADQ	ADQ
Ridge St. - Church St.	40	2	100	20,000	8,000	8,000	ADQ	ADQ
Church St. - Spring St.	40	2	100	20,000	6,000	6,000	ADQ	ADQ
Spring St. - W. Market St.	40	4	100	20,000	6,000	6,000	ADQ	ADQ
W. Market St. - E. Main St.	44	4	60	20,000	4,600	4,600	ADQ	ADQ
S. Bridge St. (Surry US 21 Bus.)								
E. Main St. - Standard St.	40	4	60	20,000	7,100	7,100	ADQ	ADQ
Standard St. - Surry Co. Line	48	4	60	20,000	7,700	7,700	ADQ	ADQ
C. C. Camp Rd. (Surry Co. SR 1138)								
US 21 Byp. - I-77	22	2	100	12,000 (40,000)	4,500	9,200	ADQ	D
I-77 - Elkin Wildlife Rd.	24	2	100	12,000	3,200	5,100	ADQ	ADQ
Elkin Wildlife Rd. - E.P.A.B.	24	2	100	12,000	3,200	3,200	ADQ	ADQ
Carter Mill Rd. (Surry Co SR 1153)								
Surry Co. Line - N. Bridge St.	16	2	60	9,000	2,100	2,100	100	J

APPENDIX A
ELKIN, JONESVILLE, & ARLINGTON ROUTE INVENTORY

Facility & Section	Existing Width (ft)	Existing # of Lanes	Existing R/W (ft)	Capacity CURRENT (FUTURE)	Volume 1990 ADT	Volume 2010 ADT	Recommended R/W WIDTH	Recommended ROAD TYPE
Carter Mill Rd. (Wilkes SR 2044)								
Eller School Rd. - Pleasant Ridge	20	2	60	9,000	1,300	2,000	100	J
Pleasant Ridge - Surry Co. Line	18	2	60	9,000	1,800	1,800	100	J
Cedarbrook Rd. (Yadkin Co SR 1300)								
Swaim St. - 0.04 mi. W.	36	2	60	12,000	2,700	3,400	ADQ	ADQ
0.04 mi. W. - Mineral Springs Dr	30	2	60	12,000	2,700	2,700	ADQ	ADQ
Mineral Springs - Swan Creek Rd.	18	2	60	9,000	1,400	2,000	ADQ	ADQ
Center Rd. (Yadkin Co. SR 1331)								
US 21 Bus. - Messic Rd.	18	2	60	9,000	1,700	1,900	100	J
Messic Rd. - E.P.A.B.	18	2	60	9,000	1,700	1,900	100	J
Church St. (Surry Co.)								
Main St. - Bridge St.	30	2	60	12,000	3,400	3,400	ADQ	ADQ
Claremont Dr. (Surry Co. SR 1195)								
Johnson Ridge Rd - N. Bridge St.	24	2	60	12,000	3,200	3,200	ADQ	ADQ
Elk Spur St. (Surry Co. SR 1149)								
Wilkes Co. Line - Powers Lane	18	2	60	9,000	2,700	2,700	ADQ	ADQ
Powers Lane - Harris Ave.	30	2	60	9,000	2,900	2,900	ADQ	ADQ
Harris Ave. - Victoria St.	34	2	60	9,000	2,700	2,700	ADQ	ADQ
Victoria St. - W. Main St.	26	2	60	9,000	3,100	3,100	ADQ	ADQ
Elk Spur St. (Wilkes Co. SR 2300)								
NC 268 - 0.1 mi. E of NC 268	18	2	60	9,000	2,700	2,700	ADQ	ADQ
0.1 mi. E of NC 268 - Surry Co.	32	2	60	9,000	2,700	2,700	ADQ	ADQ
Eller School Rd. (Wilkes SR 2046)								
Walker Rd. - Murray Rd.	18	2	60	9,000	1,300	1,300	100	J

APPENDIX A
ELKIN, JONESVILLE, & ARLINGTON ROUTE INVENTORY

Facility & Section	Existing Width (ft)	Existing # of Lanes	Existing R/W (ft)	Capacity CURRENT (FUTURE)	Volume 1990 ADT	Volume 2010 ADT	Recommended R/W WIDTH	Recommended ROAD TYPE
Fall Creek Church Rd. (SR 1352)								
NC 67 - Center Rd.	18	2	60	8,000 (12,000)	500	500	100	J
Fall Creek Church Rd. (Proposed)								
Center Rd. - US 21 Bus.	NA	NA	NA	(12,000)	NA	500	100	J
S. Front St. (Surry Co.)								
Elk Spur St. - Main St.	28	2	60	10,000	2,400	2,400	ADQ	ADQ
Gwyn Ave. (Elkin)								
Bridge St. - Main St.	30	2	60	10,000	3,900	4,400	ADQ	ADQ
Howell School Rd. (Yadkin SR 1312)								
Swan Creek Rd. - Shaffner Rd.	20	2	60	9,000	600	900	100	J
Howell School Rd. (Yadkin SR 1313)								
Shaffner Rd. - US 21 Bus.	20	2	60	9,000	400	800	100	J
Interstate 77								
N.P.A.B. - US 21 Bypass	48	4	360	54,000	16,100	29,100	ADQ	ADQ
US 21 Bypass - Yadkin Co. Line	48	4	200	54,000	19,800	32,600	ADQ	ADQ
Yadkin Co. Line - NC 67	48	4	360	54,000	19,800	32,600	ADQ	ADQ
NC 67 - S.P.A.B.	48	4	260	54,000	16,600	28,900	ADQ	ADQ
Johnson Ridge Rd. (Surry SR 1144)								
NC 268 - Oak Grove Rd.	24	2	60	13,000	3,000	3,000	100	ADQ
Long Branch Rd. (Wilkes SR 2049)								
Walker Rd. - Pleasant Hill Rd.	18	2	60	9,000	700	1,100	100	J

APPENDIX A
ELKIN, JONESVILLE, & ARLINGTON ROUTE INVENTORY

Facility & Section	Existing Width (ft)	Existing # of Lanes	Existing R/W (ft)	Capacity CURRENT (FUTURE)	Volume 1990 ADT	Volume 2010 ADT	Recommended R/W WIDTH	Recommended ROAD TYPE
E. Main St. (Elkin, NC 268)								
Bridge St. - 0.2 mi. E of Market	32	2	60	14,000	8,100	8,100	ADQ	ADQ
0.2 mi. E. - 0.3 mi. E Brookwood	20	2	60	14,000	8,100	8,100	ADQ	ADQ
0.3 mi. E. - 0.4 E. of Brookwood	24	2	120	12,000	4,100	8,100	ADQ	ADQ
0.4 mi. E. - Johnson Ridge Rd.	20	2	60	12,000	4,100	5,800	ADQ	ADQ
Johnson Ridge Rd - I-77	18	2	60	12,000	3,300	4,300	100	J
W. Main St. (Elkin)								
Elk Spur St. - S. Front St.	30	2	60	10,000	1,200	2,200	ADQ	ADQ
S. Front St. - Bridge St.	-	2	-	10,000	8,100	8,100	ADQ	ADQ
Main St. (Jonesville, SR 1310)								
Yadkin Co. Line - Swaim St.	18	2	60	12,000	3,800	4,900	ADQ	ADQ
Swaim St. - US 21 Bus.	32	2	60	12,000	3,800	4,900	ADQ	ADQ
E. Market St. (Elkin)								
Bridge St. - Gwyn Ave.	20	2	100	12,000	2,000	2,400	ADQ	ADQ
Gwyn Ave. - E. Main St.	40	2	60	12,000	3,000	5,300	ADQ	ADQ
W. Market St. (Elkin)								
Bridge St. - Memorial Park Dr.	40	4	60	20,000	2,000	2,600	ADQ	ADQ
Memorial Park Dr. (Elkin)								
Elk Spur St. - Spring St.	18	2	60	9,000	600	700	ADQ	ADQ
Murray Rd. (Wilkes Co. SR 2026)								
NC 268 - W.P.A.B.	20	2	60	10,000	4,000	6,000	100	J

APPENDIX A
ELKIN, JONESVILLE, & ARLINGTON ROUTE INVENTORY

Facility & Section	Existing Width (ft)	Existing # of Lanes	Existing R/W (ft)	Capacity CURRENT (FUTURE)	Volume 1990 ADT	Volume 2010 ADT	Recommended R/W WIDTH	Recommended ROAD TYPE
NC 67								
US 21 Bus. - Valley St.	64	5	80	20,000	6,000	6,000	ADQ	ADQ
Valley St. - 0.7 mi. E	64	5	80	20,000	8,800	12,700	ADQ	ADQ
0.7 mi. E - I-77	36	3	80	20,000	8,800	12,700	ADQ	ADQ
I-77 - 0.1 mi. E of I-77	24	2	80	12,000	7,600	12,700	100	J
0.1 mi. E of I-77 - E.P.A.B.	20	2	60	11,000	6,300	9,400	100	J
NC 268 (East Section)								
Interstate 77 - E.P.A.B.	18	2	60	10,000	3,200	4,500	100	J
NC 268 (West Section)								
W.P.A.B. - Wilkes Co. Line	22	2	60	11,000	4,500	6,900	100	J
Wilkes Co. Line - US 21 Bus.	20	2	100	10,000	2,900	4,900	ADQ	ADQ
NC 268 Bypass (Proposed)								
US 21 Bypass - NC 268	NA	NA	NA	(40,000)	NA	11,500	300	B
Oakland Dr. (Elkin)								
Bridge St. - Spring St.	20	2	60	10,000	6,000	3,000	ADQ	ADQ
Old Quarry Rd. (Surry Co. SR 1134)								
Ebenzer Church - Poplar Springs	20	2	60	10,000	500	800	ADQ	ADQ
Pleasant Hill Rd. (Surry SR 1150)								
Spring St. - Poison Ivy Dr.	18	2	60	9,000	1,100	1,200	100	J
Poplar Springs Rd. (Surry SR 1001)								
US 21 Bus. - Old Quarry Rd.	24	2	60	12,000	3,500	5,000	100	J
Old Quarry Rd. - 0.1 mi. N	16	2	60	12,000	3,200	4,800	100	J
0.1 mi. N - Country Club Dr.	22	2	60	12,000	3,000	4,800	100	J
Powers Lane (Elkin)								
NC 268 - Elk Spur St.	20	2	60	12,000	700	700	ADQ	ADQ

APPENDIX A
ELKIN, JONESVILLE, & ARLINGTON ROUTE INVENTORY

Facility & Section	Existing Width (ft)	Existing # of Lanes	Existing R/W (ft)	Capacity CURRENT (FUTURE)	Volume 1990 ADT	Volume 2010 ADT	Recommended R/W WIDTH	Recommended ROAD TYPE
Shaffner Rd. (Yadkin Co. SR 1312)								
Howell School Rd. - Haynes Rd.	20	2	60	11,000	600	800	100	J
Swaim St. (Jonesville)								
Main St. - Cedarbrook Rd.	18	2	60	11,000	1,100	3,400	ADQ	ADQ
Swaim St Ext. (Yadkin Co. SR 1311)								
Swan Creek Byp. - 0.2 mi. S	24	2	60	11,000	1,100	1,500	100	J
0.2 mi. S - Haynes Rd.	18	2	60	11,000	800	1,100	100	J
Swan Creek Bypass (Proposed)								
NC 67 - NC 268	NA	NA	NA	(12,000)	NA	7,500	100	J
Bethel Church Rd. - NC 268	NA	NA	NA	(12,000)	NA	2,500	100	J
Swan Creek Bypass (Yadkin SR 1386)								
Cedarbrook Rd. - US 21 Bus.	18	2	60	9,000	2,000	5,400	100	J
US 21 (Surry Co.)								
N.P.A.B. - US 21 Bus.	22	2	200	12,000	6,400	8,800	ADQ	ADQ
US 21 Bus. (Yadkin Co.)								
Surry Co. - 0.1 mi. S of Surry Co	44	4	60	20,000	7,700	7,700	ADQ	ADQ
0.1 mi. S of Surry Co. - SR 1402	48	4	60	20,000	4,100	4,100	ADQ	ADQ
SR 1402 - NC 67	64	5	100	20,000	4,100	4,100	ADQ	ADQ
NC 67 - Main St.	40	4	100	20,000	4,100	5,200	ADQ	ADQ
Main St. - S. P. A. B.	20	2	100	12,000	5,000	6,900	ADQ	ADQ
US 21 Bypass (Surry Co.)								
US 21 Bus. - Interstate 77	48	4	250	45,000	6,000	8,900	ADQ	ADQ
Valley St. (Yadkin Co. SR 1403)								
US 21 Bus. - NC 67	24	2	120	13,000	3,000	6,500	100	J

APPENDIX B

TYPICAL THOROUGHFARE CROSS SECTIONS

Cross section "A" illustrates a fully controlled access freeway. Rural Interstates typically have this cross section. The twelve-foot lanes, wide median and wide shoulders provide maximum speed, efficiency, and safety for travelers.

Cross section "B" illustrates a rural four-lane divided highway which may have either full or partial control of access. The twelve-foot lanes, median, and shoulders provide high speed, efficient, and safe traffic flow.

Cross section "C" illustrates an urban four-lane divided highway with curb, gutter and partial control of access. This curb and gutter section only uses half of the shoulder section right-of-way and still allows efficient and safe traffic flow.

Cross section "D" illustrates an urban four-lane highway with a raised median and partial control of access. Since raised medians are narrower than sloped medians, only 100 feet of right-of-way are necessary for efficient and safe traffic flow.

Cross section "E" illustrates a five-lane urban roadway with four through lanes and a center turning lane. Turning vehicles crossing the main traffic flow create accident hazards and traffic friction.

Cross section "F" illustrates a four-lane roadway with no center lane for left turns. When traffic volumes are high, vehicles turning left into driveways block traffic in the through lane. Additional left turn lanes are typically necessary at major intersections.

Cross section "G" illustrates a two-lane road with parking on both sides. Because this facility serves both land use and traffic, it should be designated a minor thoroughfare or a local street.

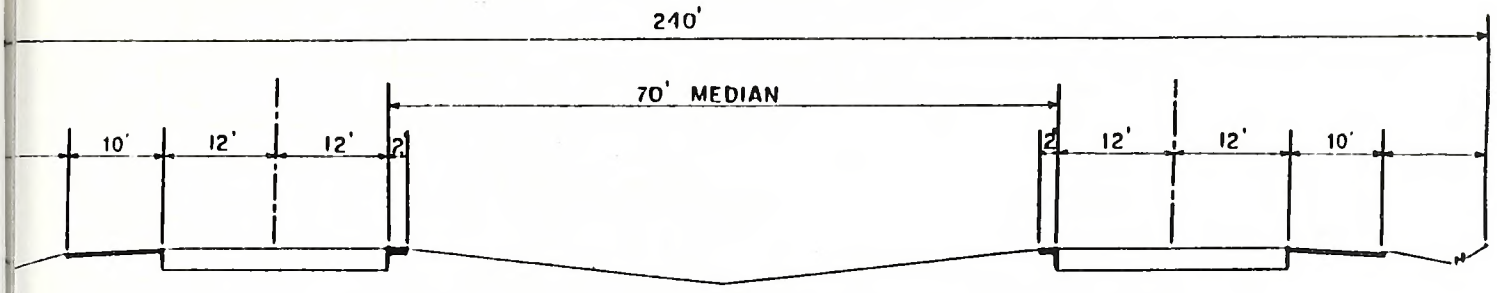
Cross section "H" illustrates a three-lane roadway. For two-directional traffic flow, the center lane can be a turning lane. For one-way traffic flow, all three lanes flow in the same direction with a parallel road operating in the opposite direction.

Cross section "I" illustrates a two-lane road with parking on one side. Because this facility serves both land use and traffic, it should be designated a minor thoroughfare or a local street.

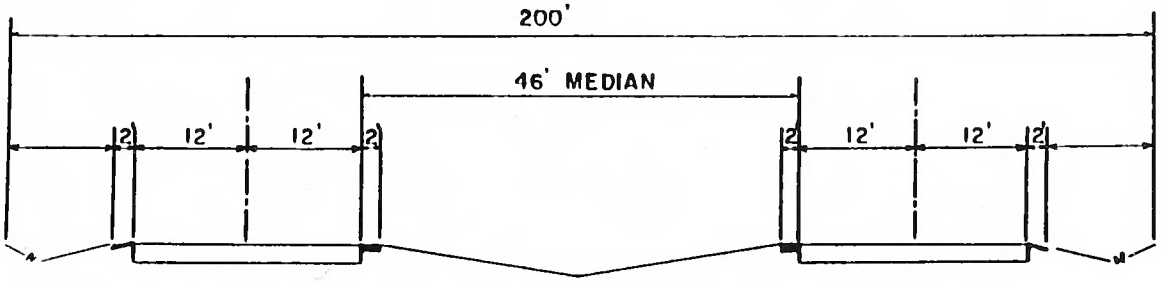
Cross section "J" illustrates a rural two-lane roadway with shoulders. When two lanes will have enough capacity through the design year, but may ultimately need additional capacity, 100 feet of right-of-way are recommended. This allows future local officials the ability to widen the road as much as necessary, up to a four-lane divided cross section with a raised median.

The curb and gutter urban cross sections illustrate the sidewalk between the road and the utility strip. The sidewalk width is the minimum recommended safety buffer between moving automobiles and utility poles. For additional pedestrian safety and community aesthetics, municipalities often place sidewalks outside of this buffer zone. Additional right-of-way is necessary if the sidewalk is moved farther away from the street. In addition, communities encouraging bicycling should allow additional right-of-way for the bicycle facilities. The *Guide For Development of New Bicycle Facilities* published by the American Association of State Highway and Transportation Officials details design standards for bicycle facilities.

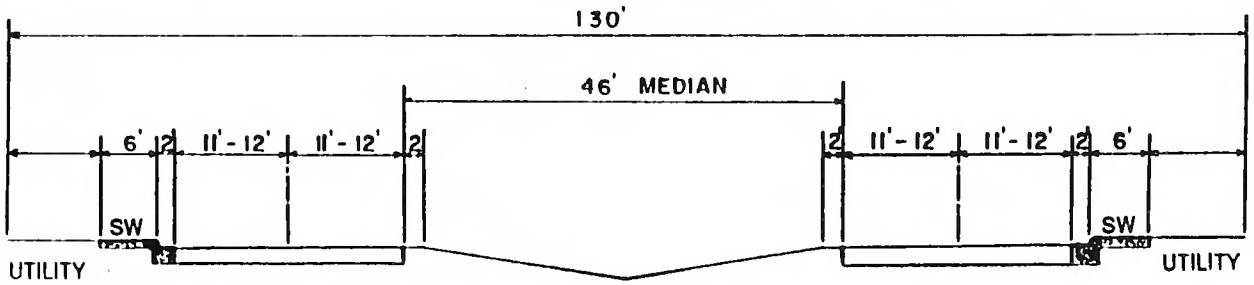
TYPICAL THOROUGHFARE CROSS SECTIONS



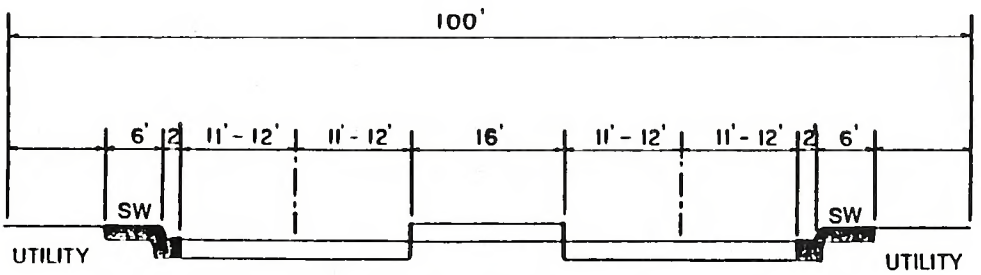
A. FOUR LANES DIVIDED WITH MEDIAN - FREEWAY



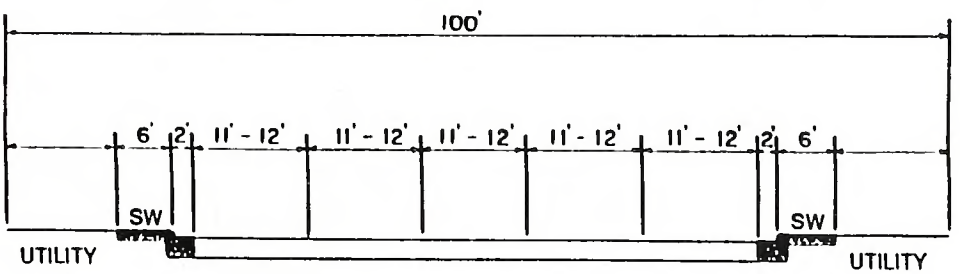
B. FOUR LANES DIVIDED WITH MEDIAN - RURAL



C. FOUR LANES DIVIDED - URBAN BOULEVARD

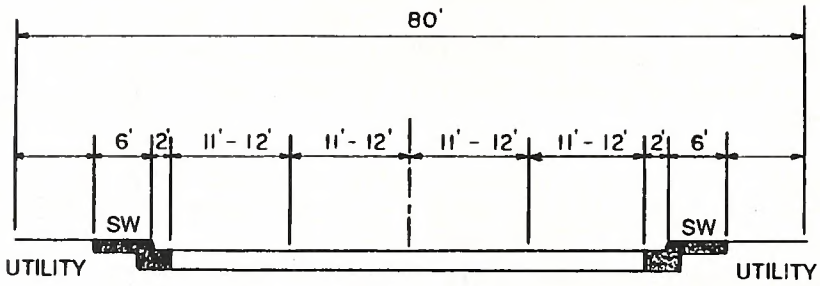


D. FOUR LANES DIVIDED WITH RAISED MEDIAN

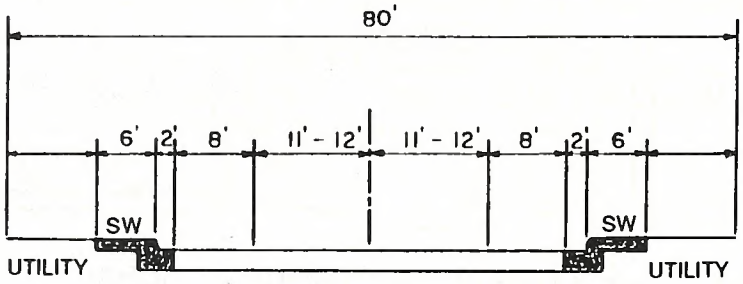


E. FIVE LANES

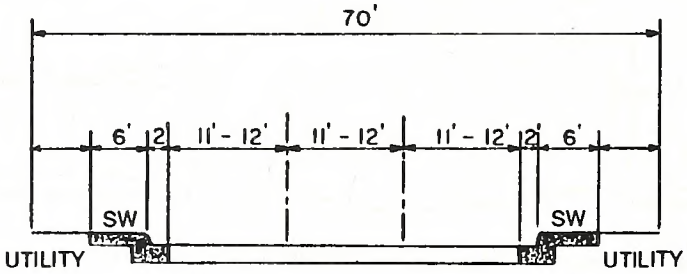
FIGURE 13



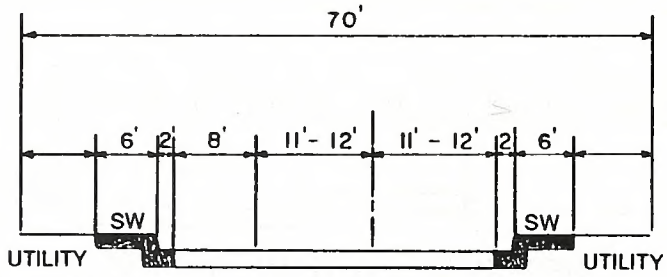
F. FOUR LANES



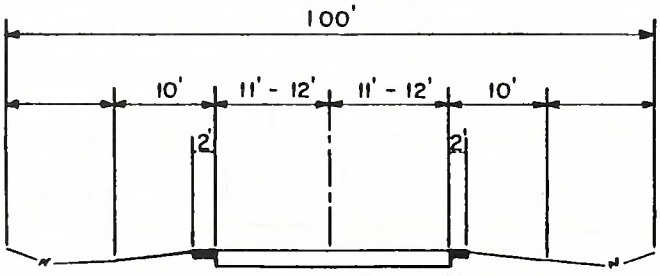
G. TWO LANES
PARKING ON EACH SIDE



H. THREE LANES



I. TWO LANES - PARKING ON ONE SIDE



J. TWO LANES - RURAL

APPENDIX C
COMPUTER MODEL DATA

THROUGH AND EXTERNAL TRIP SUMMARY

LOCATION (STA #)	1990 ADT	1990 THRU	1990 EXT.	2010 ADT	2010 THRU	2010 EXT.
SR 2070 #109	1,000	500	500	1,220	600	600
US 21 #110	5,500	1,800	3,700	8,195	2,700	5,500
I-77 #115	16,100	13,100	3,000	29,141	23,600	5,500
NC 268 #116	1,700	500	1,200	2,533	700	1,800
NC 67 #117	4,500	2,400	2,100	5,490	3,000	2,500
SR 1331 #118	1,700	100	1,600	2,074	100	2,000
I-77 #122	15,400	13,000	2,400	27,874	23,500	4,400
SR 1300 #124	1,200	200	1,000	1,464	300	1,200
NC 268 #103	4,500	2,300	2,200	6,705	3,400	3,300
SR 2026 #106	1,800	100	1,700	2,196	100	2,100
US 21 #121	2,000	500	1,500	2,980	800	2,200
	55,400	34,500	20,900	89,872	58,800	31,100

TRIP GENERATION RATES FOR 1990 AND 2010

Excellent DU:	11.5
Above Average DU:	9.5
Average DU:	7.5
Below Average:	5.5
Poor:	3.5
Commercial Auto:	7.0
Commercial Trucks:	6.7

PERCENTAGE OF TRIPS CATEGORIZED BY PURPOSE

Internal of total:	85%
Home based work:	24%
Other home based:	54%
Non home based:	22%

SECONDARY TRIP SUMMARY

(TOTAL EXTERNAL - INTERNAL TO EXTERNAL) * (0.4)
1990 SECONDARY TRIPS = 6005 VPD
2010 SECONDARY TRIPS = 9759 VPD

REGRESSION EQUATIONS

HOME BASE WORK PURPOSE:

Trip Attractions = Total Employees

OTHER HOME BASE PURPOSE:

Trip Attractions = 0.50*X1 + 1.83*X2 + 8.36*X3 + 2.25*X4 + 2.60*X5 + 3.37*X6 + 0.50*(TOT DU)

NON HOME BASE PURPOSE

Trip Attractions = 0.50*X1 + 1.83*X2 + 8.36*X3 + 2.25*X4 + 2.60*X5 + 3.37*X6 + 0.50*(TOT DU)

EXTERNAL-INTERNAL PURPOSE

Trip Attractions = 0.50*X1 + 1.83*X2 + 8.36*X3 + 2.25*X4 + 2.60*X5 + 3.37*X6 + 1.00*(TOT DU)

Where X1 = Industrial Employment (SIC # 1-21, 24, 26-49)
X2 = Retail Employment (SIC # 50-54, 56, 57, 59)
X3 = Highway Retail Employment (SIC # 55, 58)
X4 = Service Employment (SIC # 70-76, 78-89, 99)
X5 = Office Employment (SIC # 60-67, 91-97)
X6 = Hospital Employment (SIC # 80)

1990 ZONE DATA							
ZONE	DWELLING UNITS EXC	AAV	AVG	BAV	POOR	COMMERCIAL AUTOS	TRUCKS
1	0	7	30	4	2	1	29
2	2	7	18	12	5	2	18
3	0	4	17	11	2	0	2
4	0	1	9	5	1	0	0
5	3	3	10	12	0	0	4
6	0	4	23	16	4	0	6
7	0	0	1	2	0	0	0
8	1	5	12	23	4	0	1
9	0	2	4	7	0	0	0
10	2	5	9	10	1	0	10
11	0	4	14	6	2	0	0
12	4	7	28	21	2	0	0
13	0	0	4	0	0	0	0
14	0	1	15	14	0	0	0
15	0	4	6	11	0	0	7
16	0	8	11	9	1	0	0
17	0	4	11	13	0	0	1
18	0	2	3	16	3	0	0
19	0	0	4	6	10	0	0
20	15	16	21	16	4	0	0
21	1	0	9	21	3	0	23
22	0	0	0	0	0	0	0
23	0	1	3	15	0	0	0
24	1	15	6	25	2	0	1
25	0	1	15	6	0	0	0
26	5	9	7	21	2	0	0
27	10	24	11	17	12	0	0
28	0	2	6	17	7	0	4
29	0	7	6	9	0	2	8
30	8	81	52	51	4	0	2
31	26	6	10	14	1	0	6
32	4	17	55	30	5	2	2
33	1	1	13	8	3	0	0
34	2	11	27	12	0	0	0
35	0	0	13	15	2	0	0
36	0	0	2	2	3	0	1
37	0	1	3	5	0	5	2
38	0	0	0	0	2	24	0
39	0	0	8	3	0	1	1
40	0	0	11	6	0	4	18
41	1	5	23	101	21	0	0
42	1	4	168	29	0	0	0
43	53	42	20	24	2	4	20
44	37	20	3	0	0	0	0
45	0	0	12	21	2	0	5
46	0	0	0	0	0	8	38
47	0	2	39	73	1	11	27

1990 ZONE DATA							
ZONE	DWELLING UNITS EXC	AAV	AVG	BAV	POOR	COMMERCIAL AUTOS	TRUCKS
48	0	1	32	123	18	0	53
49	0	0	57	81	11	0	4
50	0	3	53	30	12	0	10
51	0	1	40	48	6	4	22
52	0	0	17	20	1	0	6
53	5	5	7	15	2	0	0
54	1	0	18	36	16	2	0
55	1	2	11	10	0	0	0
56	2	4	6	19	9	0	0
57	1	5	31	3	1	0	0
58	0	9	41	26	1	0	1
59	10	44	97	14	13	3	20
60	7	14	62	28	2	7	15
61	0	4	8	10	2	0	0
62	0	0	0	0	0	23	38
63	1	5	39	36	8	1	27
64	1	1	22	11	1	0	19
65	4	7	12	8	5	0	0
66	0	1	18	17	1	0	0
67	4	9	38	20	1	0	3
68	0	3	12	7	8	0	1
69	2	10	17	13	6	0	6
70	0	2	19	38	11	0	0
71	1	8	61	114	8	3	19
72	0	0	0	14	2	2	4
73	1	5	17	13	2	1	25
74	7	31	91	17	2	9	2
75	1	19	109	93	13	4	33
76	1	5	38	123	23	0	3
77	0	10	47	22	33	0	3
78	0	7	24	11	2	0	0
79	0	7	25	47	25	0	2
80	0	3	25	21	5	0	0
81	0	0	44	66	14	0	6
82	0	1	1	20	8	2	2
83	0	1	23	10	1	0	0
84	2	1	3	6	3	0	0
85	0	2	2	6	3	0	0
86	0	4	6	1	1	0	0
87	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0

1990 ZONE DATA							
	DWELLING UNITS					COMMERCIAL	
ZONE	EXC	AAV	AVG	BAV	POOR	AUTOS	TRUCKS
95	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0
TOTAL	229	567	1,945	1,936	393	125	560

1990 EMPLOYMENT DATA							
ZONE	X1	X2	X3	X4	X5	X6	TOT DU
1	89	0	0	1	0	0	43
2	512	0	3	3	0	0	44
3	0	2	9	0	0	0	34
4	0	0	0	0	0	0	16
5	0	0	2	10	0	0	28
6	0	4	0	6	0	0	47
7	0	0	0	0	0	0	3
8	2	0	0	0	0	0	45
9	0	0	3	4	0	0	13
10	0	23	0	9	0	0	27
11	0	0	0	1	0	0	26
12	0	0	0	0	0	0	62
13	0	5	28	86	0	0	4
14	0	1	0	0	0	0	30
15	0	0	0	7	0	0	21
16	0	0	0	0	0	0	29
17	16	0	0	0	0	0	28
18	0	0	0	1	0	0	24
19	0	0	0	0	0	0	20
20	0	1	0	0	0	0	72
21	0	15	0	35	0	0	34
22	0	0	0	21	0	0	0
23	0	0	0	1	0	0	19
24	0	4	16	6	0	0	49
25	0	0	0	0	0	0	22
26	0	0	0	0	0	0	44
27	0	2	0	1	0	0	74
28	0	0	3	3	0	0	32
29	0	0	0	120	0	0	22
30	0	22	6	8	0	0	196
31	0	0	0	8	0	0	57
32	3	5	11	5	0	0	111
33	0	1	0	1	0	0	26
34	0	0	0	3	0	0	52
35	0	0	0	35	0	0	30
36	0	150	7	18	2	0	7
37	275	40	7	254	2	0	9
38	0	58	25	14	22	0	2
39	0	62	77	28	21	0	11
40	0	65	49	26	5	0	17
41	0	0	0	0	0	0	151
42	0	1	0	0	0	0	202
43	0	1	46	31	4	284	141
44	0	0	0	0	0	0	60
45	438	0	0	1	0	0	35
46	2,193	0	0	0	0	0	0
47	0	35	22	63	0	0	115
48	82	20	58	29	3	0	174

1990 EMPLOYMENT DATA							
ZONE	X1	X2	X3	X4	X5	X6	TOT DU
49	1	0	0	1	0	0	149
50	0	0	8	18	0	0	98
51	0	0	6	41	3	0	95
52	0	0	6	7	0	0	38
53	0	0	0	0	0	0	34
54	0	3	0	14	0	0	71
55	0	0	0	0	0	0	24
56	0	0	0	0	0	0	40
57	0	0	0	2	0	0	41
58	0	0	3	5	0	0	77
59	24	2	0	5	0	0	178
60	215	178	9	122	68	0	113
61	0	20	0	27	9	0	24
62	26	107	9	102	43	0	0
63	28	32	63	125	24	0	89
64	5	7	0	16	0	0	36
65	0	0	0	15	0	0	36
66	0	0	0	5	0	0	37
67	0	6	2	1	0	0	72
68	0	0	0	3	0	0	30
69	0	0	0	43	0	0	48
70	0	0	0	0	0	0	70
71	0	6	18	23	0	0	192
72	0	0	20	0	5	0	16
73	0	0	0	63	1	0	38
74	0	0	0	11	0	0	148
75	9	9	5	31	2	0	235
76	0	1	1	9	6	0	190
77	0	0	0	4	0	0	112
78	1	0	0	0	0	0	44
79	73	4	0	9	0	0	104
80	0	0	0	0	0	0	54
81	0	1	0	24	0	0	124
82	0	2	1	0	0	0	30
83	0	0	1	1	0	0	35
84	0	0	0	0	0	0	15
85	0	0	0	0	0	0	13
86	0	0	0	0	0	0	12
87	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0

1990 EMPLOYMENT DATA							
ZONE	X1	X2	X3	X4	X5	X6	TOT DU
97	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0
TOTAL	3,992	895	524	1,566	220	284	5,070

2010 ZONE DATA							
	DWELLING UNITS					COMMERCIAL	
ZONE	EXC	AAV	AVG	BAV	POOR	AUTOS	TRUCKS
1	2	12	33	4	2	1	29
2	2	9	21	12	5	5	32
3	0	6	19	12	2	0	2
4	0	1	11	6	1	0	0
5	3	4	12	12	0	0	5
6	0	5	24	16	4	0	6
7	0	0	1	2	0	0	0
8	1	10	27	30	4	0	1
9	0	7	16	12	0	0	1
10	2	8	15	13	1	0	10
11	0	5	17	7	2	0	0
12	4	9	32	22	2	0	0
13	0	0	4	0	0	0	1
14	0	2	16	14	0	0	0
15	0	5	8	12	0	0	7
16	0	10	13	10	1	0	0
17	6	15	17	13	0	0	1
18	6	8	14	16	3	0	0
19	0	3	7	7	10	4	19
20	15	31	36	16	4	0	0
21	1	0	10	23	3	0	24
22	0	0	0	0	0	0	0
23	0	1	4	17	0	0	0
24	1	18	8	26	2	0	2
25	0	2	19	7	0	0	0
26	14	25	15	21	2	0	0
27	20	35	13	17	12	1	3
28	0	7	14	19	7	0	4
29	3	13	12	9	0	2	9
30	11	87	58	51	4	0	2
31	32	16	16	14	1	0	6
32	8	24	59	30	5	2	2
33	5	8	17	8	3	0	0
34	4	13	32	12	0	0	1
35	1	1	18	15	2	0	0
36	0	0	2	2	3	0	2
37	0	1	3	5	0	5	2
38	0	0	0	0	2	24	0
39	0	0	8	3	0	1	2
40	0	0	11	6	0	4	19
41	1	20	38	101	21	0	0
42	1	4	169	29	0	0	0
43	54	42	20	24	2	4	21
44	38	20	3	0	0	0	0
45	0	0	12	21	2	0	5
46	0	0	0	0	0	8	38
47	6	2	39	73	1	11	28

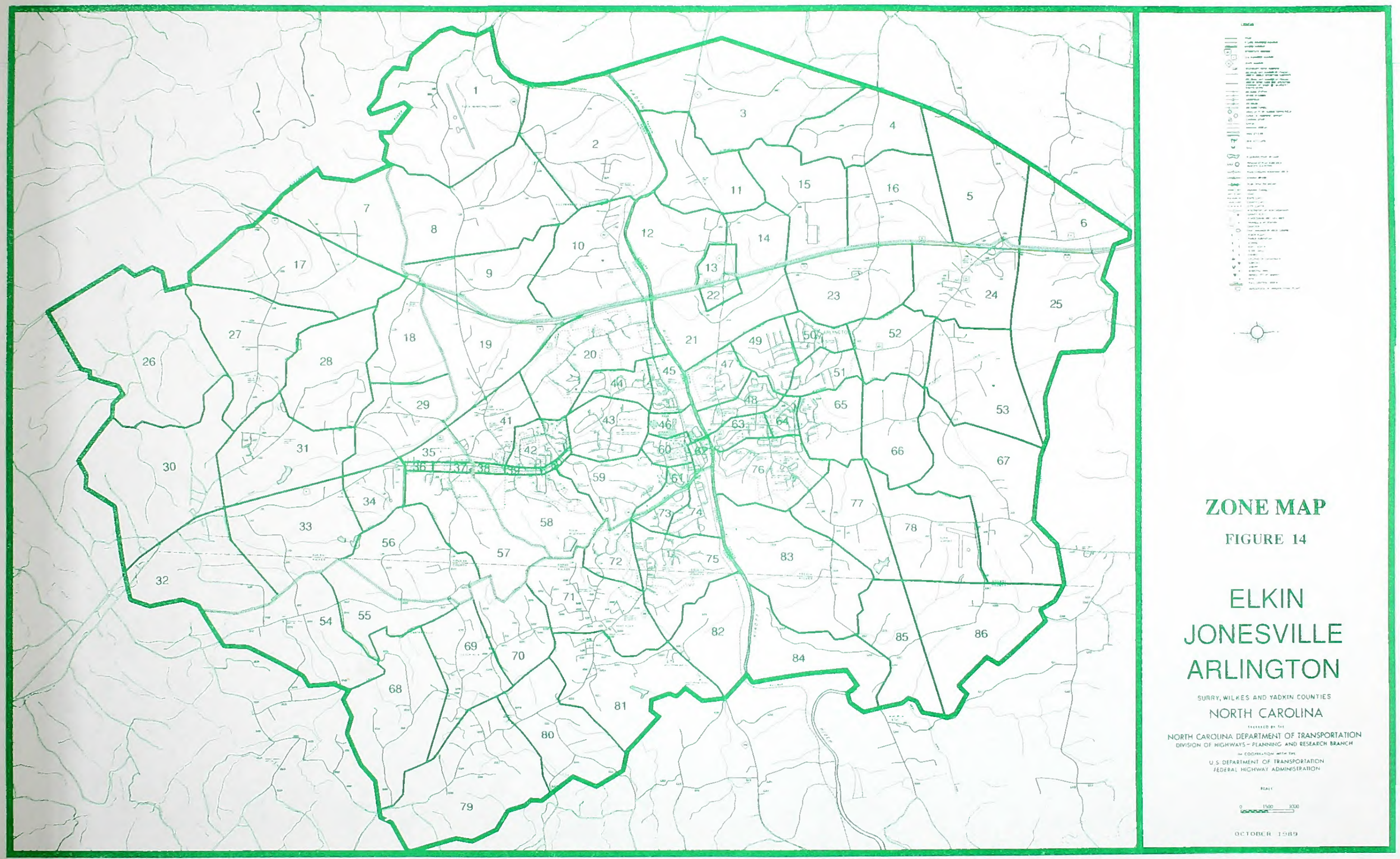
2010 ZONE DATA							
	DWELLING UNITS					COMMERCIAL	
ZONE	EXC	AAV	AVG	BAV	POOR	AUTOS	TRUCKS
48	6	1	32	123	18	0	53
49	6	0	57	81	11	0	4
50	6	3	53	30	12	0	10
51	6	1	41	49	6	4	22
52	6	1	21	22	1	0	6
53	11	6	11	18	2	0	0
54	1	2	22	38	16	2	0
55	2	4	14	10	0	0	0
56	4	7	12	19	9	0	0
57	3	8	37	3	1	0	0
58	0	10	42	26	1	0	1
59	10	45	97	14	13	3	20
60	7	14	62	28	2	7	15
61	0	4	8	10	2	0	0
62	0	0	0	0	0	23	38
63	7	5	39	36	8	1	27
64	7	1	22	11	1	0	20
65	10	10	12	8	5	0	0
66	6	3	22	19	1	0	0
67	12	11	42	20	1	0	3
68	1	6	16	7	8	0	1
69	3	12	21	14	6	0	7
70	0	3	23	41	11	0	0
71	1	11	64	119	8	3	20
72	0	0	4	18	2	3	7
73	1	6	21	16	2	1	25
74	7	31	91	17	2	9	2
75	1	19	109	93	13	4	33
76	7	7	41	123	23	0	3
77	6	14	53	24	33	0	4
78	8	11	30	11	2	0	0
79	0	8	29	51	25	0	2
80	0	6	30	23	5	0	0
81	0	2	52	72	14	0	6
82	0	2	4	21	8	2	2
83	9	5	30	10	1	0	0
84	10	5	5	6	3	0	0
85	6	4	6	7	3	0	0
86	9	7	12	1	1	0	0
87	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0

2010 ZONE DATA							
	DWELLING UNITS					COMMERCIAL	
ZONE	EXC	AAV	AVG	BAV	POOR	AUTOS	TRUCKS
95	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0
TOTAL	420	784	2,230	2,008	393	137	613

2010 EMPLOYMENT DATA							
ZONE	X1	X2	X3	X4	X5	X6	TOT DU
1	89	0	0	1	0	0	53
2	696	0	3	3	0	0	49
3	0	2	9	0	0	0	39
4	0	0	0	0	0	0	19
5	0	0	2	20	0	0	31
6	0	4	0	6	0	0	49
7	0	0	0	0	0	0	3
8	2	0	0	0	0	0	72
9	0	0	10	14	0	0	35
10	0	23	0	9	0	0	39
11	0	0	0	1	0	0	31
12	0	0	0	0	0	0	69
13	0	5	17	107	0	0	4
14	0	1	0	0	0	0	32
15	0	0	0	7	0	0	25
16	0	0	0	0	0	0	34
17	16	0	0	0	0	0	51
18	0	0	0	1	0	0	47
19	185	18	7	40	0	0	27
20	0	1	0	0	0	0	102
21	0	24	0	35	0	0	37
22	0	0	0	21	0	0	0
23	0	0	0	1	0	0	22
24	0	4	23	6	0	0	55
25	0	0	0	0	0	0	28
26	0	0	0	0	0	0	77
27	0	11	7	21	0	0	97
28	0	0	3	3	0	0	47
29	0	9	0	130	0	0	37
30	0	22	6	8	0	0	211
31	0	0	0	8	0	0	79
32	3	5	11	5	0	0	126
33	0	1	0	1	0	0	41
34	0	0	0	13	7	0	61
35	0	0	0	35	0	0	37
36	0	159	7	18	2	0	7
37	275	40	7	254	2	0	9
38	0	58	25	14	22	0	2
39	0	62	84	28	21	0	11
40	0	74	49	26	5	0	17
41	0	0	0	0	0	0	181
42	0	1	0	0	0	0	203
43	0	1	46	31	11	284	142
44	0	0	0	0	0	0	61
45	438	0	0	1	0	0	35
46	2,193	0	0	0	0	0	0
47	0	35	22	183	0	0	121
48	82	20	58	29	3	0	180

2010 EMPLOYMENT DATA							
ZONE	X1	X2	X3	X4	X5	X6	TOT DU
49	1	0	0	1	0	0	155
50	0	0	8	18	0	0	104
51	0	0	6	41	3	0	103
52	0	0	6	7	0	0	51
53	0	0	0	0	0	0	48
54	0	3	0	14	0	0	79
55	0	0	0	0	0	0	30
56	0	0	0	0	0	0	51
57	0	0	0	2	0	0	52
58	0	0	3	5	0	0	79
59	24	2	0	5	0	0	179
60	215	178	9	122	68	0	113
61	0	20	0	27	9	0	24
62	26	107	9	102	43	0	0
63	28	32	63	125	24	0	95
64	5	61	0	16	0	0	42
65	0	0	0	15	0	0	45
66	0	0	0	5	0	0	51
67	0	6	2	1	0	0	86
68	0	0	0	3	0	0	38
69	0	9	7	43	0	0	56
70	0	0	0	0	0	0	78
71	0	6	18	33	7	0	203
72	0	9	27	20	5	0	24
73	0	0	0	63	1	0	46
74	0	0	0	11	0	0	148
75	9	9	5	31	2	0	235
76	0	1	1	9	6	0	201
77	0	0	42	64	0	0	130
78	1	0	0	0	0	0	62
79	73	4	0	9	0	0	113
80	0	0	0	0	0	0	64
81	0	1	0	24	0	0	140
82	0	2	1	0	0	0	35
83	0	0	1	1	0	0	55
84	0	0	0	0	0	0	29
85	0	0	0	0	0	0	26
86	0	0	0	0	0	0	30
87	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0

2010 EMPLOYMENT DATA							
ZONE	X1	X2	X3	X4	X5	X6	TOT DU
97	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0
TOTAL	4,361	1,030	604	1,897	241	284	5,835



ZONE MAP

FIGURE 14

ELKIN
JONESVILLE
ARLINGTON

SURRY, WILKES AND YADKIN COUNTIES

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - PLANNING AND RESEARCH BRANCH

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1500 3000

OCTOBER 1989

APPENDIX D

EXAMPLE SUBDIVISION ORDINANCES

DEFINITIONS

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - a rural road serving statewide or interstate travel. Principal Arterial roads should serve high volumes of through traffic, not direct land access.

2. Minor Arterial - a rural road serving intrastate and inter-county travel by connecting cities and towns. Minor Arterial roads should provide efficient traffic flow, but may have limited direct land access.

3. Major Collector - a rural road serving major intra-county travel and large traffic generators. Major Collector roads should connect traffic to the Arterial roads.

4. Minor Collector - a rural road serving local communities and moderate traffic generators. Minor Collector roads should provide both traffic movement and direct land access.

5. Local Road - a rural road which provides direct access to adjacent land.

B. Urban Streets

1. Major Thoroughfare - a major street which carries high volumes of traffic in and through urban areas. Major Thoroughfares primarily serve traffic movement, not direct land access.

2. Minor Thoroughfare - a street which connects local streets to Major Thoroughfares. Minor Thoroughfares should serve both traffic movement and direct land access.

3. Local Street - a street which provides direct access to adjacent land.

C. Specific Streets (Rural or Urban)

1. Interstate Highway - a divided multilane highway designed to carry large volumes of high speed traffic through states. Interstate Highways must be accessed by interchanges because they do not provide any direct land access.

2. Freeway - a divided multilane highway designed to carry large volumes of high speed traffic. Freeways must be accessed by interchanges because they do not provide any direct land access.

3. Expressway - a divided multilane roadway designed to carry large volumes of high speed traffic. Expressways have either full or partial control of access and generally have grade separations at major intersections.

4. Parkway - a roadway designed for non-commercial traffic. Parkways may have either full or partial control or access.

5. Frontage Road - a road that is parallel to a partial or full access controlled facility. Frontage roads provide direct land access.

6. Local Residential Street - a street less than one mile long that does not serve major traffic generators or collect traffic from more than 100 dwelling units. Local residential streets can be cul-de-sacs or circles.

7. Alley - a narrow road used only for service vehicles accessing the back side of properties.

8. Cul-de-sac - a short street having one end open to traffic and the other end a vehicular turnaround.

II. Property

A. Building Setback Line - a line parallel to the street which specifies the minimum distance between the street right-of-way and buildings.

B. Easement - a grant by the property owner limiting the land use on a specific piece of property. For example, the property owner can give or sell easement rights for a street across a particular section of the property.

C. Lot - a portion of land which can be bought or sold. A lot may also be referred to as a plat, parcel, or tract.

III. Subdivision

A. Subdivider - a person, firm, corporation or official agent who divides large lots into smaller lots.

B. Subdivision - (1) All divisions of a tract of land into two or more lots or building sites for sale or development (2) All divisions of land involving the dedication of new streets or changes in existing streets.

C. Dedication - Property given by the owner to another party. Official dedications are made and accepted in writing.

D. Reservation - An agreement to keep property free from development for a period of time. Property reservations do not involve any transfer of property rights.

All roads shall be designed in accordance with the North Carolina Department of Transportation policies or American Association of State Highway and Transportation Officials' policies.

I. Right-of-way - Minimum right-of-way (ROW) for roads shall conform with the recommendations listed in the thoroughfare plan. When the thoroughfare plan does not specify a ROW, the following widths should be used:

	Min. ROW
A. Rural Roads	
1. Principle Arterial Freeway	350 ft.
2. Other Principle Arterial	200 ft.
3 Minor Arterial	100 ft.
4. Major Collector	100 ft.
5. Minor Collector	80 ft.
6. Local Road	60 ft. (1)
B. Urban Roads	
1. Major Thoroughfare other	100 ft.
2. Minor Thoroughfare	70 ft.
3. Local Street	60 ft. (1)
4. Cul-de-sac	Variable (2)

(1) The minimum desirable ROW is 60 feet, but if curb and gutter is provided, 50 feet of ROW is adequate on local residential streets.

(2) The ROW dimension will depend on radius used for vehicular turnaround. The distance from the edge of the pavement of the turnaround to ROW should not be less than distance from edge of pavement to ROW on the street approaching turnaround.

Subdivisions should provide access to properties from local streets. Direct property access to major thoroughfares, principle arterials, minor arterials, and major collectors should be avoided.

When proposed subdivisions conflict with proposed thoroughfares, the subdivider shall dedicate the necessary ROW for the proposed thoroughfare. The subdivider will only be required to dedicate a maximum of 100 feet of ROW. In cases where over 100 feet of ROW are needed, the subdivider should dedicate 100 feet, and reserve the amount in excess of 100 feet.

When a proposed subdivision borders a proposed thoroughfare, and undeveloped land boarders the opposite side of the proposed thoroughfare, partial width ROW may be dedicated. However, the partial ROW must be at least

sixty feet, and the width of the partial dedication must be wide enough to construct necessary facilities to serve abutting lots. Subsequently, when the undeveloped land on the opposite side of the road is subdivided, the remainder of the required ROW shall be dedicated.

When proposed subdivisions are adjacent to proposed thoroughfare widenings, subdividers shall dedicate the necessary ROW for the proposed thoroughfare widening.

II. Street Widths - Street widths should conform with the recommendations listed in the thoroughfare plan. When the thoroughfare plan does not specify a street width, the following widths should be used:

A. Local residential streets with a curb and gutter should have 26 feet of pavement from face-to-face of the curb. Local residential streets with a shoulder should have twenty feet of pavement and four foot shoulders.

B. Residential collector streets with a curb and gutter should have 34 feet from face-to-face of the curb. Residential collector streets with a shoulder should have twenty feet of pavement and six foot shoulders.

III. Geometric Characteristics - The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System.

A. Design Speed - The design speed should be a minimum of 5 miles per hour greater than the posted speed limit. The design speeds for subdivision streets shall be:

DESIGN SPEEDS			
Facility Type	Desirable	Minimum Level	Rolling
RURAL			
Minor Collector Roads	60	50	40
Local roads	50	50 (1)	40 (1)
URBAN			
Major Thoroughfares other than Freeway or Expressway	60	50	50
Minor Thoroughfares	60	50	40
Local Streets	40	40 (2)	30 (2)

(1) Based on average daily traffic of 400-750.
(2) Based on average daily traffic of 50-250.

B. Maximum and Minimum Grades

1. The maximum grades in percent shall be:

MAXIMUM VERTICAL GRADE		
Design Speed	Terrain Level	Rolling
60	4	5
50	5	6
40	6	7
30		9

2. Minimum grade should not be less than 0.5%.

3. Grades for 100 feet each way from intersections (measured from edge of pavement) should not exceed 5%.

4. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% of the value in the above table.

C. Minimum Sight Distance - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

SIGHT DISTANCE				
Design Speed	30	40	50	60
Stopping Sight Distance:				
Minimum (ft.)	200	275	400	525
Desirable Minimum (ft.)	200	325	475	650
Minimum K (1) Value for:				
Crest curve	30	80	160	310
Sag curve	40	70	110	160

(1) K is a coefficient which the algebraic difference in grade is multiplied to determine the length of the vertical curve which will provide the desired sight distance. (General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)

D. The superelevation table below shows the maximum degree of curve and maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter of 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

SUPERELEVATION TABLE			
Design Speed	Maximum e	Minimum Radius ft.	Max. Deg. of Curve.
30	0.04	302	19 00′
40	0.04	573	10 00′
50	0.04	955	6 00′
60	0.04	1,528	3 45′
30	0.06	273	21 00′
40	0.06	509	11 15′
50	0.06	849	6 45′
60	0.06	1,380	4 15′
30	0.08	252	22 45′
40	0.08	468	12 15′
50	0.08	764	7 30′
60	0.08	1,206	4 45′

e = rate of superelevation in feet per foot

IV. Intersections

A. Streets shall intersect as nearly as possible at right angles. No street should intersect any other street at an angle less than sixty-five degrees.

B. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.

C. Offset intersections should be avoided. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey center lines.

D. Intersections along major thoroughfares should be spaced at regular intervals. Five hundred feet is the minimum desirable spacing between intersections.

V. Cul-de-sacs

Cul-de-sacs shall not be more than five hundred feet long.

VI. Alleys

Alleys shall be at least twenty feet wide. Dead-end alleys shall be avoided. However, if dead-end alleys are unavoidable, adequate turnaround facilities shall be provided at the dead-end.

VII. Driveways Connecting To State Roads

A permit from the Department of Transportation is required for connecting driveways to any state maintained road. Permit approval is required prior to any construction on the road. Driveway permit applications are available from the District Engineer's office.

VIII. Offsets To Utility Poles

On roadways with shoulders, utility poles should be located a minimum of thirty feet from the edge of pavement. On streets with curb and gutter, utility poles should be a minimum of six feet behind the face of the curb.

IX. Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

X. Bridge Deck Width

A. The bridge deck widths for new bridges serving 2-lane, 2-way traffic should meet the following specifications:

1. Shoulder section approach
   a. If the design year average daily traffic is under 800 vehicles per day, the bridge deck should be ten feet wider than the roadway width or 28 feet, whichever is greater.

b. If the design year average daily traffic is between 800 and 2000 vehicles per day, the bridge deck should be twelve feet wider than the roadway width or 34 feet, whichever is greater.

c. If the design year average daily traffic is over 2000 vehicles per day, the desirable bridge deck is 44 feet. The minimum bridge deck width is 40 feet.

2. Curb and gutter approach

a. If the design year average daily traffic is under 800 vehicles per day, the bridge deck should be a minimum of 24 feet from face-to-face of curbs.

b. If the design year average daily traffic is over 800 vehicles per day, the bridge deck should be the width of the approach pavement from face-to-face of curbs.

c. Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height and in crown drop. The distance from face of curb to face of parapet or rail shall be a minimum of one and a half feet. (greater if sidewalks are desired).

B. The bridge deck widths for new bridges having four or more lanes serving undivided two-way traffic should meet the following specifications:

1. If the approaching roadway has a shoulder, the bridge deck should have the width of approach pavement plus width of usable shoulders on both sides. Ten foot shoulders are desirable, but minimum shoulders of eight feet acceptable.

2. If the approaching roadway has a curb and gutter, the bridge deck should have the width the of approach pavement measured from face-to-face of the curbs.

APPENDIX E
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